With No 39

Sailing Directions

FOR THE NAVIGATION OF THE

NORTH SEA;

Arranged and Revised from the latest English, French, Dutch, and Danish Surveys;

ORIGINALLY COMPILED

By J. W. NORIE, Hydrographer,

Author of a Complete Epitome of Practical Navigation, &c.

A NEW EDITION,

REVISED AND CORRECTED TO THE PRESENT TIME,

BY J. S. HOBBS, F.R.G.S.

HYDROGRAPHER.

Sailing Directions

FOR THE NAVIGATION OF

THE NORTH SEA;

CONTAINING

INSTRUCTIONS FOR SAILING INTO ALL THE BAYS, HARBOURS, AND ROADSTEADS, ON THE EASTERN COASTS

OF

ENGLAND AND SCOTLAND,

FROM

The Downs to the Shetland Islands, &c.;

ALSO ON THE OPPOSITE SHORES OF

FRANCE, THE NETHERLANDS, GERMANY,

AND

PART OF NORWAY,

From Calais to the Scaw, Christiania, Bergen, and Drontheim.

ORIGINALLY COMPILED

By J. W. NORIE, Hydrographer,

Author of a Complete Epitome of Practical Navigation, and other Nautical Works.

A New Edition,

ARRANGED AND REVISED FROM THE LATE

ENGLISH, FRENCH, DUTCH, and DANISH SURVEYS;

INCLUDING ALL THE

Alterations and Instructions made and published by order of the Honourable Corporation of Trinity House, the Commissioners of the Northern Lighthouses, the Board of Trade at Hamburgh, &c., &c.

By J. S. HOBBS, F. R. G. S.,

HYDROGRAPHER.

London:

PRINTED FOR, AND PUBLISHED BY C. WILSON,

(Late J. W. NORIE & WILSON,)

Chartseller to the Admiralty, the Hon. East India Company, and Corporation of Trinity House,

At the Navigation Warehouse and Naval Academy,

157, LEADENHALL STREET, NEAR THE ROYAL EXCHANGE.

1854.

N.B.—Alterations and Additional Information will be given in supplementary pages as occasion may require, for which see ADDENDA, page x.

ANY REMARKS OR COMMUNICATIONS FROM OUR NAUTICAL FRIENDS, FOR THE FUTURE IMPROVEMENT OF THIS, OR OTHER OF OUR WORKS, ARE RESPECTFULLY SOLICITED.

Entered at Stationers' Hall.

LONDON :—PRINTED BY JAMES COOKES, 51, FENCHURCH STREET.

CONTENTS.

THE COASTS OF FRANCE, FLANDERS, HOLLAND, AND JUTLAND, FROM CALAIS TO THE SCAW.

List of Lighthouses and Light-vessels with the pages where they will be found more fully described.

Name of Light.	Place.	Fixed or Revolving.	De-scribed In Page
	COAST OF SCOTLAND.		
Inchkeith	Centre of the Island	1 Revolving	44
Leith	E. and W. piers	2 Fixed	45
	Burntisland, Kirkcaldy, Pittenween, and Anstruther have fixed lights		45 to 47
Bell Rock	Centre of the rock	1 Revolving	49
St. Andrews	Cathedral wall and pier-head	3 Fixed	„
Buddon Ness	North shore of the River Tay	2 „	„
Lights in the River Tay	Buddon, Port on Craig, Newport, and Dundee		„
Arbroath	N. pier-head	1 „	51
Montrose	N.E. side of the river	2 „	52
Stonehaven	On the pier	2 „	„
Girdleness	On the Ness	2 „	„
Aberdeen	On south shore and north pier	3 „	53
Buchan Ness	On the Ness	1 Revolving	56
Peterhead	N. and S. harbour, W. pier-heads	2 Fixed	57
Kinnairds Head	On the head	1 „	„
Fraserburgh	On the pier-head	2 „	„
Banff	On Brea Head	1 „	„
Macduff	Pier-head	1 „	„
Covesea Skerries	On Craig Head	1 Revolving	58
Chanonry	On the Point	1 Fixed	„
Cromarty	On the Point	1 „	59
Tarbet Ness	On the Ness	1 Revolving	„
Latheronwheel	At the S. entrance	1 Fixed	60
Wick	S. pier-head	1 „	„
Noss Head	On the head	1 Revolving	„
Pentland Skerries	On Great Skerry	2 Fixed	62
Dunnet Head	On the head	1 „	„
Cape Wrath	On the Cape	1 Revolving	63
	THE ORKNEY AND SHETLAND ISLANDS.		
Start Point	E. point of Sanda Island	1 Fixed	64
North Ronaldsha	On Dennis Head	1 Revolving	„
Kirkwall	On the pier-head	1 Fixed	65
Hoy Sound	On Gremsa Island	2 „	66
Sumburg Head	The S. point of the Shetlands	1 „	71
Outer Skerries	Proposed		
	From CALAIS to the SCAW.		
Cape Grisnez	On the cape	1 Revolving	84
Calais	Fort Rouge and Western Jetty	2 Fixed	85
„	On a tower on old fortifications	1 Revolving	„
Gravelines	On Fort Phillippe, E. side	1 Fixed	„
Dunkirk	On the pier-head	1 Revolving	„
„	West Mole Head & Heuguenar Tower	2 Fixed	„
Nieuport	East side of the port	1 „	86
Ostende	N.E. corner of the town	1 „	„
„	Harbour lights, various	4 „	„
Blankenberg	In a small fort	1 „	97
Heyst	On the sand-hills N. of the town	1 „	„
Weilinge light-vessel	Near the Paarde Markt Sand	1 „	„

Name of Light.	Place.	Fixed or Revolving.	Described In Page
West Kapelle	On the church	1 Fixed	97
Flushing	At the west harbour	1 „	„
Terneuse	W. Harbour Dyck	1 „	98
Camp Veer	S. side of canal	1 „	„
Schouwen	N.W. side of the island	1 Revolving	„
Zierickzee	W. pier of harbour	1 Fixed	„
Renesse	N. side of Schouwen	2 „	„
Verklikker	N.W. part of Schouwen	1 „	„
Goeree	On the church tower	1 „	„
Stone Beacon	N. side of Goeree	1 „	„
Maas	N.W. part of Voorne	2 „	99
Hellevoet Sluys	W. pier of the harbour	1 „	„
Brielle	On the eastern pier	1 „	„
Scheveningen	On the Downs, S. of the village	1 „	113
Catwyk-aan-Zee	ditto S. of ditto	1 „	„
Noordwyk	N. of the village	1 „	„
Zandvoort	ditto	1 „	„
Egmond	West of the town	2 „	„
Kykduin	On the fort	1 „	114
Nieudeep	On the extreme and inner part of Weirhead	2 „	117
Vlieland	E. part of the village	1 „	119
Ter Schelling	Brandaris Tower, W. end of island	1 Revolving	„
Borkum	On the island	1 Fixed	121
Wanger Oog	N.W. part of the island	1 Revolving	123
Heligoland	On the island	1 Fixed	„
River Weser	2 light-vessels and small harbour light at Bremerhaven	3 „	125
River Elbe	Outer and pilot light-vessels	2 „	126
„	Inner light-vessel	2 „	„
Neuwerk	On the island	2 „	„
Kugelbaake	On the point	1 „	127
Cuxhaven	W. side of entrance	1 „	„
	(also several small lights as far as Gluckstadt)		„
Eider River	Light-vessel at entrance	1 „	135
Fohr Island	At Wyk Harbour	2 „	136
Dagebull	On the Dyke	2 „	„
Amrum	Building		„
Sylt Island	North end of the island	2 „	137
Hantsholm	N.W. point of Jutland	1 Revolving	140
Scaw	1½ mile W. of the point	1 Fixed	„
	THE COAST OF NORWAY.		
The Naze	On the cape	1 Revolving	142
Ox-Oe Island	E. entrance to Christiansand	1 Fixed	143
Oddero	Island near Christiansand	1 „	„
Arendal Lights	Torungerne Islands and Sandvig Point	3 „	„
Jomfruland	On the centre of the island	1 Revolving	„
Langosund	On Lango Island	1 Fixed	„
Færder	On Færder Great Island	1 „	142
Fugelhuk	On the rock	1 Revolving	„
Christiania Fiord	Several small lights	Fixed	147
Gunnarshoug Point	Near Lister W. point	3 „	„

Name of Light.	Place.	Fixed or Revolving.	Described In Page
Varnaes	On the point	1 Fixed	147
Hviddings-Oe	On the island	1 Revolving	148
Tungenæs	On the point	1 Fixed	„
Tjeldoen	On the island	1 „	„
Skuddesnæs	On S.E. point & at Vigholmen	2 „	„
Bukken	On the island	1 „	149
Hoievarde	In Carm Sound	1 „	„
Udsire	On the island	2 „	„
Sorhougo	On the rock	1 „	„
	From hence to Bergen are several small lights	Fixed	„
Bergen	On Nordnaes Point	1 „	„
Rondo	N.W. point of island	1 „	151
Valderhoug	In Breedt Sound	1 „	„
Quitholmen	On the island	1 Revolving	152
Stavnæs	N.E. point of Averoen	1 Fixed	„
Ringholmen	On the rock	1 „	„
Terningen	On the island	1 „	„
Agdaness	On the point	1 „	„
Monkholmen	On the fortress	1 „	„

REMARKS ON THE DEVIATION OR LOCAL ATTRACTION.

It may not be improper to observe in this place, that the needle is subject to a *local attraction*, resulting principally from the masses of iron on board ship, by which it will be drawn more or less from the magnetic meridian, according as the disturbing cause is situated with regard to the needle; this effect is called the *aberration of the needle*. For further particulars on this subject, see pages 207 and 208, eleventh, twelfth, thirteenth, fourteenth, and fifteenth editions of *Norie's Epitome of Navigation*, in which excellent work will be found the following Table (see page 208), thereby showing the allowances that are made for the aberration of the needle, at the same time proving the extraordinary changes of the variation, according to the direction of the ship's head.

Ship's Head by Compass.	*Variations.*	*Ship's Head by Compass.*	*Variations.*
	° ′		° ′
North.	24 30 W.	South.	24 30 W.
N. N. E.	23 21	S. S. W.	25 39
N. E.	22 23	S. W.	26 37
E. N. E.	21 44	W. S. W.	27 16
East.	21 30	West.	27 30
E. S. E.	21 44	W. N. W.	27 16
S. E.	22 23	N. W.	26 37
S. S. E.	23 21	N. N. W.	25 39

Hence the variations to be allowed are opposite the courses steered; thus, if the ship's head is E.N.E., the variation to be allowed is 21° 44′ west; but if W.S.W., the variation to be allowed is 27° 16′ W. All the courses given in this work will be subject to this correction.

ADDENDA.

Since the publication of this Work, the following important alterations have been made in the navigation therein described, and which the mariner will please to mark with his pen in their respective places, before perusing the directions therein given.

BARROW SAND, WEST SWIN.—A spiral buoy, painted black-and-white, in circular stripes, has been placed on the Barrow Sand; the buoy lies in 6 fathoms, with the following marks:—The north end of Wakering trees in line with the Maplin light-house W. by N. ½ N.; Mouse light-vessel W. by S. ½ S.; Swin Middle light-vessel N.E. by N.; and N.E. Maplin buoy N.W. ¼ N. (Page 4.)

(N.B.—A spiral buoy has been placed at the West Barrows station in substitution of the ordinary buoy previously thereat.

RIVER TEES.—On and after 22nd September, 1854, the buoys at the entrance of the River Tees, numbered 1, 2, 3, and 4, which have heretofore been painted white, will be coloured *red*. (Page 27.)

Dunkirk, March 16th, 1854.—Masters of vessels are informed, that the pilot-boat of the port of Dunkirk, stationed in the North Sea, will in future cruise between the Flanders banks and the Goodwin Sands, in order to ship pilots on board vessels requiring their assistance. This cruise will commence on the 1st of May, each year, and will terminate on the 15th of November. (Page 85.)

Sailing Directions

FOR THE GENERAL CHART OF

THE NORTH SEA.

NOTICES.

Throughout this work the Soundings are taken at low water, spring-tides: the Bearings and Courses are Magnetic; and the Distances are in Nautical Miles, of 60 to a Degree.

The variation of the Compass off the East Coast of England is about 2 points west, increasing to the northward to $2\frac{1}{2}$ points off the Coast of Scotland and the Orkney and Shetland Islands. On the opposite shore, between the Coasts of France and Norway, the Variation is nearly 2 points; but in the body of the North Sea, about $2\frac{1}{4}$ points.

Buoys placed over or near the wrecks of sunken vessels are nun-buoys, painted of a green colour, and marked with the word "Wreck."

Gongs are tolled on board the light-vessels during fogs, and they have in the day-time a red ball or balls at the mast-heads, which, in the event of the vessels driving from their proper stations, will be struck.

The following notice was issued from the Trinity House, dated 1st January, 1851 *:—*

Directions to the masters and mates of their several light-vessels to the following effect, viz.:—

In the event of any light-vessel being driven from her station, the master or mate, whichever be in charge, is carefully to consider whether she has driven to such a distance, or in such a direction, as to make it dangerous to shipping to continue to show her lights; and if the distance or direction be not such as to endanger the safety of vessels running on their course, the *lights and balls* are to be continued in the usual manner.

But should the light-vessel have driven so as to be of no use as a guide to shipping, the *usual lights and balls* are, in that case, to be *discontinued*, and *two red lights substituted* —one at the end of the davit forward, the other at the end of the ensign-staff; and a *red flare-light* shown every quarter of an hour during the night.

And further,

When vessels are observed from a light-vessel to be in distress, or to require assistance:—

If in the day-time, two guns are to be fired on board such light-vessel, each at an interval of 5 minutes, and repeated every half-hour until assistance be observed approaching.

If in the night-time, two guns are to be fired on board such light-vessel, at similar intervals, each followed by a white rocket thrown in the direction of the vessel in distress; and these signals are to be continued until the required assistance has been rendered.

Masters of vessels, pilots, and other persons, are earnestly required to take such necessary note of these regulations as may be useful both for the avoidance of danger to themselves, and for aiding their endeavours to render assistance to others.

By order, J. Herbert, *Sec.*

INTRODUCTORY REMARKS.

THE navigation of the waters of the North Sea from London may be said to commence at the Nore; and the greater part of the commerce carried on through its medium to the various ports on its coasts and the northern and eastern navigation, being to the northward, through the Swin and King's Channel, we shall commence these Instructions at the Nore, proceeding down the Swin towards Orfordness to the northward, respectfully referring the mariner to the Book of Directions for the River Thames and its entrances, which always accompanies the large Chart of the River, commencing at London Bridge, and describing the whole navigation to the Downs and Yarmouth Roads to Orfordness; and which appertains more particularly to the in-shore navigation.

FROM THE NORE, THROUGH THE SWIN AND KING'S CHANNEL, TO ORFORDNESS.

Description of the Sands from the Nore, through the Swin and Sledway, and to Orfordness.

THE TIDES AT THE NORE, on full and change days, flow at $\frac{1}{2}$ past 12h. (mean time); and the water rises about 14 feet.

THE NORE SAND* extends from the shallows of Yantlet Flats and the Blyth Sand, on the southern side of the River Thames, in the direction of S.E. by E. $\frac{1}{4}$ E. From about $\frac{1}{3}$ of a mile to the eastward of the black buoy of the Jenkin, it commences to dry to the extent of 2 miles, and within $1\frac{1}{3}$ mile from the light-vessel; it then runs off to the depths of 10, 15, 18, and 24 feet, to where the light-vessel is moored.

The passage from the Nore and through the Swin and King's Channel, is bounded by the *Foulness*, or *Maplin*, *the Whitaker*, and *Gunfleet Sands*, on the northern side; and the *Mouse*, *Barrows*, *Middle*, *Heaps*, and *Sunk* on the southern side.

THE FOULNESS, OR MAPLIN SAND, is an *extensive flat*, or continuation of sands which run off the northern shore of the Thames, from Leigh and Southend to the eastward, so far as the entrance to the River Crouch; it chiefly dries, and is covered at about $1\frac{1}{2}$ hour flood. Its breadth about Shoebury is a mile from shore; off Foulness Island it is $3\frac{1}{2}$ miles broad; and off Crouch Point (the entrance of the river) its breadth becomes almost 5 miles. Its eastern edge is steep, and pointed out by buoys and a lighthouse, which will be described hereafter.

THE WHITAKER is an extension of the ridge, or north part of the Maplin, from which it runs off in an easterly direction, and has a red buoy and beacon lying near its eastern edge. Between this buoy and the Maplin is a swashway, or passage for small vessels into the River Crouch, of 9 and 12 feet.

THE GUNFLEET is an *extensive sand*, running from the Spitway, in an E. by N. direction, full 11 miles. Its breadth is from 1 to $1\frac{1}{4}$ mile. Off its western end are two buoys; at its eastern extremity is a black beacon nun-buoy; its south-eastern edge is marked by a beacon and three buoys, and also by a light-vessel. Several parts of this sand become dry at low water; about a mile below the beacon it is nearly divided in two by a deep inlet from the north side, on each side of which there is a part of the sand which dries; the eastern one called the *East Knock*, dries $3\frac{1}{2}$ feet; it commences about $2\frac{1}{4}$ miles W. by S. from the east black beacon buoy, and extends $1\frac{1}{2}$ mile along the northern edge of the sand, and is $\frac{1}{2}$ a mile wide. On the western part is the extensive patch called the Gunfleet, which dries $2\frac{1}{2}$ feet at low water, is $4\frac{1}{2}$ miles in length, and a mile in breadth. From the west end of this patch, a shallow *flat* of from 1 to 5 feet, extends $2\frac{1}{4}$ miles to the spitway. The flats at the east end, between the East Knock and the beacon buoy, are called the Gunfleet Heads. The northern edge of these sands is steep-to, and form the southern boundary of the Wallet; and its southern edge the northern limit of the East Swin.

THE MOUSE forms the western extremity of the Barrows, and is distinguished by a light-vessel.

THE WEST BARROW is that part of a very *extensive flat*, which forms the southern

---

*The spit to the W.N.W. of the white buoy, has for some time past been gathering up very considerably.

boundary of the West Swin; it extends from the Mouse light full 4 miles, is $\frac{3}{4}$ of a mile wide and dries, being covered at $2\frac{1}{4}$ hours' flood. On its northern edge is a buoy, chequered black, and-white.

From the north-eastern part of this shoal the *Barrow Flats* run north-easterly, nearly 10 miles, terminating near the buoy of the Heaps. The Barrow Flats have several parts upon them which dry at low water, and are all over shallow and dangerous; the north-western edge forms the channel between the flats and the Heaps and Middle, and has on it a *knoll*, called *East Barrow Head*, nearly a mile in extent, covered at about $1\frac{1}{2}$ hour of the flood. Its south-eastern edge is divided from the Knock John by the Barrow Deeps. These flats are about 3 miles broad.

THE SWIN MIDDLE, OR HEAPS, form a *narrow curved sand*, 6 miles long, marked out by three buoys and by a light-vessel, stationed at its western end. The channel between it and the Barrow Flats is called the Middle Deep, and has from 6 to 9 fathoms in it. The passage to the northward is the one commonly used, and called the East Swin, or King's Channel.

THE SUNK is a continuation of the Oaze and Knock John, running in an E.N.E. direction; it is narrow, with numerous *dry patches* upon it, and nearly parallel to the Gunfleet, at 3 or 4 miles' distance, with from 8 to 12 fathoms between them. It terminates in a point about S.E. by E. $\frac{1}{2}$ E., distant $5\frac{1}{4}$ miles from the Gunfleet beacon. Off its head, distant nearly $1\frac{1}{4}$ mile N.N.E., is a light-vessel; and on the Sand Head is a chequered red-and-white buoy.

THE PASSAGES toward Orfordness are formed by the following *shoals*:—The *West Rocks*, *Upper and Lower Rough*, the *Shipwash*, the *Bawdsey*, the *Kettle Bottom*, the *Cutler*, and the *Whiting*.

Between the West Rocks Shoal and the Gunfleet is a channel into the Wallet, called Goldmer's Gatway, about $1\frac{1}{2}$ mile wide, and having 5, 6, and 7 fathoms in it.

THE WEST ROCKS are *a dangerous and large cluster*, lying directly before the entrance to Harwich, some parts becoming nearly dry at low water. They extend from the Naze Flats to a black-and-white buoy, which is placed on a spit at their eastern end, their breadth being 2 miles.

UPPER ROUGH lies about one mile to the westward of the Lower Rough red buoy.

LOWER ROUGH.—N.E. $\frac{3}{4}$ N., 3 miles from the East Spit buoy of the West Rocks, is the east end of the Lower Rough, a *reef*, of 2 to 3 fathoms, running about $1\frac{3}{4}$ mile in a N. direction. Its eastern side has a red buoy upon it.

To the north-eastward of the Upper Rough lie the Shipwash, Bawdsey, and Whiting; the two former of these sands forming the eastern side of the channel, called the SLEDWAY; while the West Rocks, Rough, and Cutler, are its western boundaries.

THE SHIPWASH is a long and narrow sand, having at its S.W. extremity a large beacon buoy, striped horizontally black-and-white; and near its N.E. end a light-vessel. These lie N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S. from each other, distant 8 miles; and about midway between is another buoy, on the N.W. side of the sand; it is coloured black-and-white, in horizontal stripes, and lies in $7\frac{1}{2}$ fathoms. Some parts become dry at low ebbs, and both sides are steep.

This is a dangerous bank to vessels coming from the offing, as the depth of soundings give no indication of your approach towards it; and there are 6, 7, and 8 fathoms close to its outer edge.

The light-vessel is intended for the use of ships of great draught of water passing through the channel between the Bawdsey and Shipwash Sands, called the SHIPWAY, instead of going through Hollesley Bay.

THE BAWDSEY SAND is 4 miles long and $\frac{1}{2}$ broad near its S.W. end; upon it the depths of water are irregular, but nowhere have less than 12 feet at low water been found on it, although perhaps on some of the knolls there may be less. Upon the S.W. part lies a black-and-white chequered buoy; and upon the Bawd Head, or N.E. end, lies a black buoy.

The shoalest water is near its S.W. end, there being only 2 fathoms, commencing near the chequered buoy, and extending thence north-easterly towards the N.E. buoy. Vessels should, therefore, be cautious of approaching too near this part of the coast. Between the north end of the Bawdsey Sand and the Shipwash, the channel is about $1\frac{3}{4}$ mile wide, in which are 8 or 9 fathoms.

THE WHITING is a narrow slip of *sand*, lying N.E. by E. $\frac{1}{2}$ E. and S.W. by W. $\frac{1}{2}$ W., $3\frac{1}{4}$ miles in length, and having three red buoys upon it; the northernmost buoy with a staff and ball. The two lights of Orfordness in one, lead just on the inner edge of the sand, and close to the Cutler Buoy; but the low light must be kept to the westward of the high light in working through Hollesley Bay.

KETTLE BOTTOM.—Between the west end of the Whiting and Bawdsey Sands is a *knoll*, called the Kettle Bottom, with only $2\frac{1}{2}$ fathoms on it, lying N.N.E., distant $1\frac{1}{2}$ mile from the S.W. buoy of the Bawdsey. From this knoll a *shoal* projects about $\frac{1}{2}$ a mile to the northward, with $4\frac{1}{2}$ and 5 fathoms on it, and to the southward, with the same depths, till it nearly joins the Bawdsey Sand, having on each side of it 6 and 7 fathoms water. The channel between them is about $\frac{1}{3}$ a mile wide. Between the Kettle Bottom and the Whiting are 6 and 7 fathoms, and a good passage, keeping within $\frac{1}{2}$ a mile from the buoy of the Whiting, or the sea-mark,

near the north end of Bawdsey Cliff, W.N.W. $\frac{3}{4}$ W. The N.E. end of Bawdsey Sand is opposite to the middle of the Whiting; the channel between them is about two miles wide, with 8 and 7 fathoms in it. The mark to carry you through this channel, is Felixstow Church on with the rising part of Felixstow Cliff.

THE CUTLER is a *rocky shoal*, lying about $1\frac{1}{4}$ mile from Bawdsey Cliff; it extends about N.E. by N. and S.W. by S., a little over a mile, and has over it, at least depth, 3 feet. A black buoy is now placed near its S.W. end, in $4\frac{1}{2}$ fathoms.

Buoys, Beacons, Light-Vessels, &c.

NORE SAND BUOY (white) is about $1\frac{1}{2}$ mile from the Jenkin buoy, and N.W. by W. $\frac{1}{2}$ W. 2 miles from the light-vessel, on the northern edge of the sand, in $2\frac{1}{2}$ fathoms water, with Southend Terrace bearing N. $\frac{1}{2}$ W.; and River Middle east buoy N. by W. $\frac{1}{2}$ W., $1\frac{1}{2}$ mile. At $1\frac{1}{2}$ cable's distance north of the buoy are $4\frac{1}{2}$ fathoms water, thence 5 and $4\frac{1}{2}$ towards the middle of the channel.

The NORE LIGHT-VESSEL is computed to be about 41 nautical or 47 statute miles from London Bridge. The marks for it are, Minster Church, bearing S.S.W. $\frac{1}{4}$ W.; the Garrison Point at Sheerness W. by S., $3\frac{1}{4}$ miles; and Great Wakering Church N.N.E.

This light-vessel (painted red, with "NORE," in white letters, on each side,) exhibits a fixed light elevated 38 feet above the level of the water, and visible 10 miles.

SHOEBURY NESS, or KNOCK BUOY, (black) lies in 4 fathoms, to be left on the port side when outward bound. Its marks are the lighthouse on Southend Jetty, N.W.; Mile Town New Church, S.S.W. $\frac{1}{4}$ W.; Middle Shoebury buoy E.S.E.; and Nore light-vessel S.S.E.

SHOEBURY MIDDLE BUOY (black) lies in 3 fathoms, with Hamlet Windmill in line with the west end of Southend Terrace, N.W.; Queenborough Windmill in line with the highest windmill at Mile Town S.W. $\frac{1}{4}$ W.; and Nore light-vessel S. by W. $\frac{1}{4}$ W.

SHOEBURY EAST BUOY (black) lies in 6 fathoms, with Blacktail Spit buoy, E. $\frac{1}{4}$ S.; Middle Shoebury buoy W. by N. $\frac{1}{2}$ N.; and Nore light-vessel W. by S. $\frac{1}{2}$ S. To be left on the port hand, going down.

CANT BUOY is white, and lies upon the edge of the sand, in 4 fathoms, to be left on the starboard side. The marks are, Shottenden mill just open of the high land of Sheppy, bearing S. by W. $\frac{3}{4}$ W.; the Nore light vessel N.W. by W. $\frac{1}{2}$ W.; and the west buoy of the Oaze E. $\frac{1}{4}$ N., distant $1\frac{3}{4}$ mile.

WEST BUOY of the OAZE is a red nun beacon-buoy, and lies in 3 fathoms, on the starboard side. Its marks are, the Nore light-vessel W.N.W. $\frac{1}{2}$ W., about $4\frac{3}{4}$ miles; Blacktail beacon-buoy N.N.E.; and the buoy of the Spile S.W. $\frac{3}{4}$ W.

BLACKTAIL SPIT BUOY.—The Blacktail Spit of the Maplin Sand having grown up in a W.S.W. direction, a large spiral black buoy, surmounted by a cage, has been placed upon the said spit, in $5\frac{1}{2}$ fathoms at low water, spring-tides, with Shottenden mill S.S.W., westerly; Prittlewell Church N.W. $\frac{1}{2}$ W.; Mouse light-vessel E. by S.; and the Nore light-vessel W. $\frac{1}{2}$ S., nearly.

MOUSE LIGHT-VESSEL lies in $5\frac{1}{2}$ fathoms, with the Blacktail spiral beacon-buoy bearing W. by N.; Canewdon Church tower N.W. $\frac{1}{2}$ N.; the Maplin lighthouse N.E. by E. $\frac{1}{2}$ E.; and the Nore light-vessel, west. This vessel exhibits a fixed light, and is to be left on the starboard hand in going down the Swin. The Mouse separates the West Swin from the Barrow Deeps, and hence becomes the eastern boundary of the Swin Channel, which here is $1\frac{1}{4}$ mile wide.

WEST BARROW buoy, coloured black-and-white, in chequers, is moored in $6\frac{1}{2}$ fathoms, on the starboard side, off the N.W. part, or elbow, of the West Barrow Sand, with the Maplin lighthouse N.E. $\frac{3}{4}$ N.; the Mouse light-vessel W. by S. $\frac{1}{2}$ S., and just clear of the north side of the sand, where it dries. At 3 ships' length to the northward of the buoy are 10 fathoms water.

S.E. MAPLIN BUOY lies in 4 fathoms at low water, with Canewdon Church, on with a barn, N.W.; Foulness Church N. by W. $\frac{3}{4}$ W.; Maplin lighthouse, well open east of the Maplin buoy, E. by N. $\frac{1}{4}$ N.; and Blacktail Spit buoy W. by S.

FOULNESS SPIT, or MAPLIN BUOY, is black, and lies in $2\frac{3}{4}$ fathoms, on the port side. Its marks are, the Mouse light-vessel S.W. $\frac{1}{4}$ S., distant $1\frac{3}{4}$ mile; the Maplin lighthouse E. by N. $\frac{1}{4}$ N., about $2\frac{1}{4}$ miles; the West Barrows buoy E. by S. $\frac{1}{2}$ S. At the distance of a cable's length to the southward of this buoy are 10 fathoms at low spring-ebbs.

MAPLIN SPIT LIGHTHOUSE is erected on screw piles, upon the south-eastern projecting part of the sand, where it becomes dry, or nearly so, at low water, spring-tides. It exhibits a red light, which is not visible to the northward of the line of the Blacktail Spit, the S.E. Maplin and Maplin Buoys. Mariners are particularly cautioned and enjoined, never, under any circumstances, either by day or by night, to attempt to cross the sand to the northward of the lighthouse.

The following alterations have been made in the Maplin light since the buoying and lighting

of the Prince's Channel, viz :—"That for the purpose of more distinctly indicating, in the night-time, the channel between the Girdler light-vessel and Shivering Sand buoy, A WHITE LIGHT is now shown at the Maplin lighthouse, ranging over 8° of the circle, striking the Girdler light in the direction of S. $\frac{1}{2}$ W., and the Shivering Sand buoy S. by W. $\frac{1}{4}$ W."

MAPLIN SPIT BUOY is black, and lies in $2\frac{3}{4}$ fathoms, rather more than a cable's length S.W., from the pile lighthouse. You must not attempt to pass between the buoy and the lighthouse.

N.E. MAPLIN BUOY.—A black buoy, marked "N.E. MAPLIN," has been placed on the N.E. part of the Maplin Sand, due N.E. of the lighthouse, distant therefrom 6-tenths of a mile, in $2\frac{3}{4}$ fathoms at low water.

SWIN MIDDLE LIGHT-VESSEL shows a revolving light every minute, elevated 38 feet above the sea, stationed near the S.W. end of the Swin Middle Sand, in 4 fathoms; the Whitaker beacon N. $\frac{1}{2}$ E.; and the Whitaker buoy N.E. $\frac{1}{4}$ E. This vessel is to be left on the east or starboard side going down.

WHITAKER BEACON, upon the Whitaker Sand, with Maplin lighthouse S.W. $\frac{1}{2}$ S.; Ridge buoy W. by N. $\frac{1}{2}$ N.; and Canewdon Church W. by N., northerly. This beacon is placed in 5 feet water, and at the distance of 160 fathoms outside of the beacon there are 3 fathoms. It is to be left on the port side when going down.

WHITAKER SPIT BUOY is red, and lies in $3\frac{1}{4}$ fathoms, about $1\frac{1}{2}$ mile E. by N. $\frac{3}{4}$ N. from the Whitaker beacon, on the port side. Its marks are, the Swin Spitway buoy N.E. $\frac{1}{2}$ N.; the North Hook Middle buoy S.S.E.; and Swin Middle light-vessel S.W. $\frac{1}{4}$ S.

SOUTH BUOY of the SWIN SPITWAY is black, and lies in 3 fathoms, to be left on the port side; its marks are, Whitaker buoy S.W. $\frac{1}{2}$ S., and Martello tower (No. 3) on the beach, near the Coast-Guard Station, in one with St. Osyth Priory, north, which latter is also a mark for the North Spitway buoy.

S.W. GUNFLEET BUOY is striped red-and-white, to be left on the port side, is placed in $3\frac{1}{2}$ fathoms water, nearly midway between the Swin Spitway buoy and the Gunfleet beacon, with Great Holland Church N.N.E.; Gunfleet beacon E. $\frac{1}{2}$ N.; South Spitway buoy W. $\frac{3}{4}$ S.; buoy of the Heaps S. by E.

GUNFLEET BEACON stands upon the Gunfleet Sand, and must be left on the port side. Its marks are, the Naze Tower N. $\frac{3}{4}$ E., distant $6\frac{1}{4}$ miles; the buoy of the Heaps S.W. $\frac{3}{4}$ W., 5 miles; the S.W. Gunfleet buoy W. $\frac{1}{2}$ S., $4\frac{1}{4}$ miles; and the south buoy of the Spitway W. $\frac{3}{4}$ S., distant $7\frac{1}{2}$ miles.

GUNFLEET SPIT BUOY, coloured black, lies in $4\frac{1}{2}$ fathoms at low water, with the Gunfleet beacon W. $\frac{3}{4}$ S.; Great Holland Church N.W. by N.; and Middle Gunfleet buoy E.N.E.

GUNFLEET LIGHT-VESSEL, in 9 fathoms at low water, spring-tides, with Dover Court Church, just open at the low point of the Naze Land, N. $\frac{1}{2}$ E.; Walton mill, just open to the right of the pier-head, N. by W.; N.E. Gunfleet buoy N.E. by E.; Gunfleet beacon W. by N. $\frac{1}{2}$ N.; and Sunk light-vessel, east, distant $3\frac{6}{10}$ miles. This light-vessel shows two bright revolving lights; that on the foremast burns at an elevation of 38 feet, and that on the mizen-mast at 20 feet above the level of the sea.

MIDDLE GUNFLEET BUOY, black-and-white, with circular bands, lies about midway between the N.E. Gunfleet buoy and Gunfleet beacon, in 5 fathoms, with Great Clacton windmill, its apparent width open westward of a small white-house on the cliff, N.W. by W. $\frac{1}{2}$ W.; Naze Tower N. by W. $\frac{1}{4}$ W.; N.E. Gunfleet buoy N.E. by E. $\frac{1}{2}$ E.; Gunfleet light-vessel N.E.; and the Sunk light-vessel S.E. by E. $\frac{3}{4}$ E.

GUNFLEET EAST BUOY is black, with a staff and ball upon it, and lies in 4 fathoms; to be left on the port side. The marks are, the Naze Tower and Walton Hall in one, bearing N.W. $\frac{1}{2}$ N.; the Gunfleet beacon W.S.W., distant 5 miles; the lights at Harwich N. by W., nearly; and the Sunk light S. by E., distant $2\frac{1}{2}$ miles.

NORTH HOOK MIDDLE BUOY is chequered red-and-white, and lies in $4\frac{1}{2}$ fathoms; to be left on the starboard. Its marks are, the Whitaker buoy N.N.W.; N.E. Middle buoy, E. $\frac{1}{2}$ N.; and the Swin Middle light-vessel W. by S. $\frac{1}{2}$ S.

N.E. MIDDLE BUOY, coloured black-and-white, in stripes, near the extremity of the north-eastern projection of this sand, called the "N.E. Middle," in $4\frac{1}{2}$ fathoms at low water, with Swin Spitway buoy N.N.W. $\frac{1}{2}$ W.; S.W. Gunfleet buoy N.E.; and Heaps buoy E. $\frac{1}{2}$ S.

BUOY of the HEAPS is a large nun beacon-buoy, coloured black, and placed on the eastern part of the Swin Middle Sand. The marks for it are, Naze Tower N.N.E. $\frac{1}{2}$ E.; Gunfleet beacon N.E. $\frac{3}{4}$ E.; Sunk light-vessel E. by N. $\frac{1}{4}$ N. and the Gunfleet light-vessel N.E. by E. $\frac{3}{4}$ E., $5\frac{1}{2}$ miles.

SUNK LIGHT-VESSEL shows one bright light, 37 feet above the sea, visible 10 miles. It lies $1\frac{1}{2}$ mile north from the eastern end of the Sunk, in 11 fathoms, and is to be left on the starboard. Its marks are, the Gunfleet beacon bearing W. $\frac{1}{2}$ N., distant nearly 5 miles; the Naze Tower N.N.W. $\frac{3}{4}$ W., the Gunfleet beacon-buoy N. by W., $2\frac{1}{2}$ miles; the black-and-white buoy on the West Rocks N.N.E. $\frac{1}{4}$ E., $4\frac{1}{4}$ miles; the S.W. beacon-buoy on the Shipwash N.E. by E., distant $7\frac{3}{4}$ miles; and the Long Sand Head buoy S.E. by E. $\frac{1}{2}$ E., $6\frac{1}{2}$ miles.

SUNK SAND HEAD BUOY is chequered red-and-white, and lies in 4 fathoms, with the

Gunfleet beacon bearing W.N.W.; and the Naze Tower N.N.W. $\frac{1}{4}$ W.; and $1\frac{1}{2}$ mile to the southward of the Sunk light-vessel.

LONG SAND HEAD BUOY is a large black nun beacon-buoy with a cross, and lies in 8 fathoms. Its marks are, the Naze Tower N.W.; Sunk light-vessel N.W. by W. $\frac{1}{2}$ W., $6\frac{1}{2}$ miles; and Kentish Knock light-vessel, S. $\frac{1}{4}$ W., 6 miles.

BUOY of the S.E. SPIT of WEST ROCKS is black-and-white, in stripes, lying in $3\frac{3}{4}$ fathoms; to be left on the port hand. The marks are, the Gunfleet beacon buoy S.W. $\frac{1}{2}$ W., distant $2\frac{7}{10}$ miles; the Sunk light-vessel S.S.W. $\frac{1}{4}$ W., $4\frac{1}{4}$ miles; the buoy of the Rough N.E. $\frac{1}{2}$ N., $2\frac{8}{10}$ miles; the S.W. buoy of the Shipwash E. $\frac{1}{2}$ N., $4\frac{3}{4}$ miles; the sea-mark on Bawdsey cliff N. by E. $\frac{1}{2}$ E., and the Naze Tower N.W. by W. $\frac{3}{4}$ W.

BUOY of the LOWER ROUGH is red, and lies on the eastern side of the Rough, in $3\frac{1}{2}$ fathoms; to be left on the port side. Its marks are, the buoy on the east spit of West Rocks S.W. $\frac{1}{2}$ S., distant $2\frac{8}{10}$ miles; the Sunk light S.S.W. $\frac{1}{2}$ W., $7\frac{1}{4}$ miles; buoy on the S.W. end of the Shipwash S.E. by E., $3\frac{1}{2}$ miles; buoy on the south part of the Bawdsey N.E., 4 miles.

BUOY on the south end of the SHIPWASH SAND is a large spiral beacon-buoy, painted black-and-white, in horizontal stripes; it lies in 4 fathoms; to be left on the starboard. The marks are, the Sunk light S.W. by W., distant $7\frac{3}{4}$ miles; the Gunfleet beacon-buoy W. by S. $\frac{1}{2}$ S., $7\frac{1}{4}$ miles; the Rough buoy N.W. by W., $3\frac{1}{2}$ miles; and the Bawdsey S.W. buoy, N. $\frac{1}{4}$ W., $4\frac{1}{2}$ miles.

MIDDLE SHIPWASH BUOY, coloured black-and-white, in horizontal stripes, is moored near the west side of the Shipwash Sand, about midway between the light-vessel at the N.E. end, and the large beacon-buoy at the S.W. end of the said sand. It lies in $6\frac{1}{2}$ fathoms at low water, with Bawdsey sea-mark N.W.; Shipwash light-vessel N.E. $\frac{1}{2}$ N.; and S.W. Shipwash buoy S.W. $\frac{1}{2}$ S.

LIGHT-VESSEL at the N.E. end of the SHIPWASH shows a fixed light, is moored in 9 fathoms at low water, and lies with Aldborough Church N. by E. $\frac{1}{4}$ E.; Orford high light N. $\frac{3}{4}$ W.; and Bawdsey N.E. buoy W. by N.

Mariners are to observe, that a S.W. course from the light-vessel (having due regard to the tides), will carry a vessel clear of the sand. Observe, when sailing along either side of the Shipwash, the flood sets W.S.W. and the ebb E.N.E., which is about 2 points athwart this sand.

BUOY on the S.W. end of BAWDSEY SAND is chequered black-and-white, and lies in 6 fathoms; to be left on the port side in proceeding through the Shipway towards Orfordness. The marks are, the Shipwash light-vessel E. by N. $\frac{1}{2}$ N.; S.W. Shipwash buoy S. $\frac{1}{4}$ E.; N.E. Bawdsey buoy N.E. by E. $\frac{1}{4}$ E.; buoy of the Rough S.W.

BUOY on the N.E. end of BAWDSEY SAND.—This buoy (black) now lies in 5 fathoms, with Aldborough Church well open to the eastward of Orfordness beach, bearing N.N.E. $\frac{1}{2}$ E.; the N.E. Whiting buoy N. by E.; Bawdsey beacon W. by N.; Orfordness high light N. by E. $\frac{1}{2}$ E.; and Shipwash light-vessel E. by S. $\frac{1}{2}$ S.

BUOY of the CUTLER is black, and lies in $4\frac{1}{2}$ fathoms; to be left on the port side. The marks are, Bawdsey Church on with a white house seen over Bawdsey cliff, bearing N. $\frac{1}{2}$ E.; and the low lighthouse at Orfordness a little open to the southward of the high one.

BUOY of the S.W. end of the WHITING is red, and lies in $3\frac{3}{4}$ fathoms water; Cutler buoy S.W. by W.; S.W. Bawdsey buoy S. by W. $\frac{1}{2}$ W.; N.E. Bawdsey S.E. by E. $\frac{1}{2}$ E.

BUOY on the HOOK of the WHITING is red, and lies in 3 fathoms water, on the inner edge of the sand, 2 miles from the S.W. buoy. Its marks are, Orfordness lighthouses in one, bearing N.E. by E.; and Orford Castle N. by E. $\frac{1}{2}$ E.

BUOY on the N.E. end of the WHITING is red, with a staff and ball, and lies in $3\frac{3}{4}$ fathoms water. Its marks are, Orford Church bearing N. $\frac{1}{2}$ W.; and the high lighthouse N.E. $\frac{1}{2}$ N.

ORFORDNESS LIGHTHOUSES.—These lighthouses are coloured *red*, both exhibiting fixed lights at an elevation of 83 and 63 feet respectively, and visible 12 miles.*

DIRECTIONS FOR SAILING FROM THE NORE, THROUGH THE SWIN, &c., TO ORFORDNESS.

SAILING from about $\frac{3}{4}$ of a mile to the northward of the Nore light-vessel, your course will be E. $\frac{1}{2}$ S., for 4 miles, which will carry you to a depth of $8\frac{1}{2}$ fathoms, thence E. $\frac{1}{4}$ S., $2\frac{3}{4}$ miles; or you may sail E. $\frac{1}{4}$ N. from the Nore light-vessel nearly 7 miles, which will bring you to the above berth off the light-vessel of the Mouse, bearing E.S.E., $\frac{3}{4}$ of a mile; and from thence to abreast of the Maplin lighthouse, E. by N. $\frac{1}{2}$ N., 5 miles; allowance being made for the tides, observing that the ebb sets to the S.E. and east. From the lighthouse, bearing W.N.W. little more than half a

* Submarine Telegraph cables lie in the direction of E.S.E. from the high light. Vessels should not anchor with the light bearing W.N.W.

mile, steer N.E. ½ N., 4 miles farther, and you will pass to the northward of the Middle light-vessel. From hence an E. by N. ¾ N. course, for about 2 miles, will bring you abreast of the North Hook buoy on the Middle; thence an E. ½ N. course 8¾ miles, will bring you nearly up to to the Gunfleet light-vessel; then steer E.N.E., 7 miles, to a depth of 9 fathoms, where you will have the Sunk light-vessel bearing S.W.; the N.E. buoy of the Gunfleet W. ½ N., and the striped buoy of the West Rocks N. by W.; from which position, a N.E. course, for 17½ miles farther, will bring you past Orfordness, with the high lighthouse bearing W. ½ N., distant about 3 miles, and about 1 mile to the south-eastward of the black buoy of the Ridge, in about 11 fathoms water.

There is a *long narrow flat* between the Nore light and the Oaze, lying nearly mid-channel, called the *Warp*, with 4½, 5, and 6 fathoms upon it, having deeper water on each side of it. Keep to the northward of the Warp until you get nearly abreast of the Blacktail beacon-buoy, athwart of which there are 7, 8, and 9 fathoms. When thus far, if the wind and tide do not allow you to proceed through the Swin, you should anchor, with the Nore light bearing W. ¼ S., distant 5½ miles. In turning, take care not to go too far to the northward of the Warp, as the Maplin Sand is steep-to.

In working down from the Nore you may stand to the northward into 6 or 8 fathoms, and towards the Oaze into 7 or 6 fathoms; but when you get down so low as the Mouse light-vessel, you must not stand into less than 7 fathoms on either side. In the middle channel are from 9 to 7 fathoms at low water. Be careful, in running from the Warp, and bound down Swin, not to go too far to the southward, lest the tide should set you in the same direction past the Mouse.

In turning from the Maplin lighthouse to the Middle light-vessel, you may stand to the Barrows into 6 fathoms, and towards the Maplin Sand into the same depth. Between the Maplin lighthouse and the Middle light vessel there is good anchorage any where, from a mile below the former to within a mile above the latter, in 9, 7, and 6 fathoms. This is an excellent roadstead; but care should be taken lest you get into the Middle Deep. The tide here sets with great strength.

The channel between the Swin Middle light-vessel and the Whitaker Spit is very narrow, being not much more than ¾ of a mile wide, with 5, 6, and 7 fathoms water in it.

The channel between the Swin Middle and Heaps on one side, and the Gunfleet on the other, is 2 miles wide: but when you have passed the black beacon-buoy of the Heaps, the passage is 3½ miles broad; this is called the East Swin, or King's Channel. As there are 5 fathoms close to the Middle and Heaps, you should not come nearer to any part of them than into 7 fathoms. Between the Middle Ground and Whitaker Flats are 5½ to 6 fathoms; and between the former and the Gunfleet are 6 and 8 fathoms.

The Sunk Sand is steep-to on both sides. In working down between the Sunk and Gunfleet, stand no nearer to the Sunk than to bring the light-vessel about E.N.E., but not more to the northward; you will then have 10, 11, and 12 fathoms water. Come not nearer the Gunfleet than 6 or 7 fathoms. When the Sunk light-vessel bears E. by N., you are then in the line between it and the buoy of the Heaps.

The new Gunfleet light-vessel is now the best guide for the East Swin in the night.

Naze Tower and Walton Hall in one, N.W. ½ N. clears the Gunfleet Head to the northward in 4½ fathoms.

When reaching down from the King's Channel towards the Shipway, the following marks are to be attended to:—the New Mill at Walton open south of the Terrace, N.W. by W. ½ W. clears the West Rocks to the southward. Barn, west of Ramsholt Church, in one with Tower T., leads over the S.E. Spit of West Rocks in 3½ fathoms. Harwich lights in one, N.N.W. ¾ W., clears the West Rocks to the N.E. in 4 fathoms.

Harwich Church just open west of Landguard Fort leads between the Roughs in 4½ fathoms. Harwich low light open north of Landguard Fort, or ¼ point open of the Cork light, clears the Lower Rough to the northward 4¾ fathoms.

The mark to clear the south end of the Shipwash half a mile, is Harwich Church and Landguard Fort in one, N.W. ¼ W.; Hollesley Steeple, 5 times its length west of Tower A.A., just clears the Shipwash and Bawdsey.

TIDES.—It is high water in the King's Channel, on full and change days, at

12 o'clock; spring-tides rise about 14, and neaps 8 feet; but allowance must be made for the wind, remembering that the tide flows sooner and rises higher with north-easterly wind, and later with an opposite one.

In the West Swin, from the West Spitway to the west end of the Oaze, the stream changes its direction at 20 min. after 12h.; in the middle, between the east end of the Gunfleet Sand and Harwich Naze, at 10 min. past 12h.; and at about 2 miles S.S.W. from the same end of the Gunfleet, at 12 o'clock.

Through the East and West Swin the flood-tide sets into the river nearly in the direction of the several shoals. The flood sets during the first 2 hours with great velocity between the Sunk and Long Sands, and the ebb in a contrary direction. Through the Swin the tide sets with considerable strength, especially in the West Swin, between the Mouse and Maplin, as also through the Middle Deeps.

The ebb-tide sets obliquely, with much strength, over the Mouse and West Barrows; you must, therefore, be careful, in going down, that it does not set you aground between them; indeed, it is necessary to use the same caution in passing through any of the channels, as the tides, setting W.S.W. and E.N.E., take an oblique direction over many of the sands and shoals, particularly those between the north end of the Shipway and Gunfleet.

SHIPS bound outward from the Swin, or King's Channel, to the north-eastward, by Orfordness, may sail through between the Bawdsey and Shipwash Sands, in what is called the SHIPWAY; or, hauling up through the Sledway, between the Rough and Bawdsey, pass through Hollesley Bay, to the westward of the Whiting, towards Orfordness, or may continue their course E.N.E. from the Swin passing to the eastward of the beacon-buoy on the South Ship Head in 7 or 8 fathoms (paying attention to the set of the tides) until they bring Orford high light to bear N. by W., distant about $8\frac{1}{2}$ miles.

In proceeding through the Sledway towards Hollesley Bay, having passed the N.E. Gunfleet buoy with the Sunk vessel bearing S.W., steer N.E. for 6 miles past the buoy of the West Rocks, and clear of the Roughs, until you get Hollesley Steeple N. $\frac{3}{4}$ W., which mark will carry you clear of the Bawdsey, and to where you will get Orfordness lighthouses in one bearing N.E. by E.; from this position a N.E. $\frac{1}{4}$ E. course for 3 miles will bring you to the anchorage in Hollesley Bay in 6 fathoms. From this anchorage an E. by N. $\frac{1}{4}$ N. course will carry you out to the northward past Orfordness, to about a mile to the south-eastward of the black buoy of the Ridge.

The best anchorage in HOLLESLEY BAY is with Hollesley Church bearing N. by W. $\frac{3}{4}$ W., or with the Parsonage-house in one with the Red Barn, in 5 or $4\frac{3}{4}$ fathoms. There is good anchorage in the north-eastern part of the bay, between the Middle or Hook buoy of the Whiting and the N.E. end of the Middle Ground, in a depth of 6 or 7 fathoms. In Hollesley Bay the tide flows, on the full and change, at 11h. 20m.

In turning through Hollesley Bay stand no nearer on either side than 6 fathoms.

Close to Orfordness the depth is 8 fathoms, with a hard bottom, and so steep that it should not be approached within less than 10 fathoms. To the westward of the Onion there is a counter-tide, which runs down with as much velocity as the tide in the channel runs up; therefore be careful not to get into this eddy.

FROM ORFORDNESS TO YARMOUTH ROADS.

Description of the Sand-Banks, Buoys, &c.

THE land about Orfordness is low, but is somewhat more elevated as you proceed to the northward; and the shoals in its vicinity are the *Onion*, *Nathaniel's Knoll*, *Ridge*, *Aldborough Knapes*, or *Napes*, and *Sizewell Bank*.

The ONION is a *shelf*, or *flat*, which runs out from abreast of Orfordness lower lighthouse, and extends $\frac{1}{4}$ of a mile from the point, having 2 fathoms water on it.

NATHANIEL'S KNOLL is the shoal water lying to the N.E. of the Onion, $\frac{3}{4}$ of a mile from the low lighthouse, with $3\frac{1}{4}$ fathoms on it.

The RIDGE extends in a N.E. by E. direction, nearly 3 miles from Orfordness, and is about

$\frac{1}{3}$ of a mile broad, and its least water 2 fathoms. A black buoy is placed on its outer edge, in 4 fathoms water, about $2\frac{1}{2}$ miles distant from Orfordness Point, with Snape Church to the left of a Martello tower near Slaughden House, bearing N.N.W. $\frac{3}{4}$ W.; Orford Church and Castle just open of each other, west; and Orfordness high light W.S.W.

Between Nathaniel's Knoll and the Ridge, is a channel $\frac{3}{4}$ of a mile wide, with from 4 to $4\frac{1}{2}$ fathoms in it at low water.

A *sandy flat*, of 4 fathoms, lines the shore of Aldborough Bay, and stretches from abreast of the Martello tower, all the way to Thorpe Ness.

ALDBOROUGH KNAPES extends N.E. and S.W., $2\frac{1}{2}$ miles, from the depth of 5 fathoms at each end. This shoal is about $\frac{1}{4}$ of a mile broad, and has only $2\frac{1}{2}$ fathoms over the middle, and 4 near each end. The N.E. end lies with Aldborough Church W.N.W. $\frac{1}{2}$ W., distant 4 miles, and Orford low light W.S.W. $\frac{1}{2}$ W., 6 miles; its S.W. end lies with Aldborough Church N.W. by N., distant $3\frac{3}{4}$ miles, and Orford low light W. $\frac{1}{4}$ S., 4 miles.

A mast-buoy, painted black, has been placed on Aldborough Knapes, near the eastern edge of the sand, in 5 fathoms water, from which Aldborough Church bears N.W.; Orford high light W. $\frac{3}{4}$ S.; and Iken Church (which has a tower steeple) N.W. by W., at $\frac{1}{3}$ of the apparent distance from Aldborough Town to Slaughden House.

SIZEWELL BANK has, within the last few years, considerably increased, and now forms a *shelf*, $\frac{3}{4}$ of a mile broad, from the south part of Aldborough Town, nearly 6 miles to the north-eastward; the depths over it varying from 4 to $1\frac{1}{2}$ fathom, but with only 9 feet at low water over the shoalest part, which lies E.N.E. $\frac{1}{2}$ E., $1\frac{1}{2}$ mile from Thorpe Ness, and $4\frac{1}{2}$ miles S. by W. from Dunwich Church. The N.E. part of the bank, in 4 fathoms, lies with Blythborough and Dunwich Churches in a line, bearing N. $\frac{1}{4}$ W.

You will clear this part by keeping Blythborough Lodge (a farm-house standing in the midst of a grove of trees) open to the eastward or right of Dunwich Church. Orford Castle open to the southward of Aldborough Town, or bearing S.W. by W. $\frac{3}{4}$ W., will lead clear to the eastward of this bank.

SIZEWELL BUOY (coloured black-and-white, in circles,) lies upon the eastern edge of this shoal, in 5 fathoms, with Leiston Church W. by N. $\frac{3}{4}$ N.; Aldborough Church S.W. by W. $\frac{1}{4}$ W.; and Orford high lighthouse S.W. $\frac{1}{4}$ W.

From Thorpe Ness a *sandy flat* continues along shore all the way to the *Barnard Sand*, the water shallowing gradually towards the land. S.E. of the town of Dunwich is the south end of a *sandy shoal*, called the *Dunwich Bank*, having over it from 4 to $3\frac{3}{4}$ fathoms; its inner edge is distant from the coast $1\frac{1}{4}$ mile, running nearly in the direction of the land, and is about $1\frac{1}{2}$ mile in length, and $\frac{1}{3}$ of a mile broad; within it are 5 fathoms water; and on its outside 6, 7, and 8 fathoms: to the north-eastward of the bank, in 5, 6, or 7 fathoms, is the part called Sole Bay, where there is anchorage in fine weather.

The BARNARD commences from the shore off Covehithe Ness, and thence extends about N.E. $\frac{1}{2}$ N., $2\frac{1}{2}$ miles; it is $\frac{1}{4}$ of a mile broad, with only 3 feet on its shallowest part at low water, being steep-to on its eastern side. Midway from the sand and the shore are from 4 to 5 fathoms. N.E. by N. from the Barnard Sand is the Newcome Sand, and between these two sands is what is called Pakefield Gatway, which at the present time is the channel most frequented by coasting vessels from the southward, through Lowestoft South Roads to Yarmouth Roads, and is pointed out by the Pakefield lighthouse, and North Barnard and South Newcome buoys.

In 1840, a narrow channel opened between Covehithe Point and the south end of the Barnard Sand, at which time two buoys were laid down, to facilitate the passage of such vessels as might, under circumstances of emergency, be induced to avail themselves of this passage.

The buoys are placed in the following situations:—A black beacon-buoy on the inside of the south end of that sand, in 15 feet at low water, spring-tides, with Lowestoft Church, its length open eastward of a gap in Kirkley Cliff, N.N.E.; S.W. Barnard buoy N.E. by E.; and Southwold Church W. by S. $\frac{1}{2}$ S. A striped black-and-white buoy, in 15 feet water, with Lowestoft Church steeple on with the gap in Kirkley Cliff, N.N.E. $\frac{1}{4}$ E.; Covehithe Church W.N.W.; and Kessingland Church, north. These buoys bear from each other W. by S. $\frac{1}{4}$ S., and E. by N. $\frac{1}{4}$ N., and the width of the channel is 180 fathoms.

BARNARD S.W. BUOY (painted red) is laid on the S.W. end of the Barnard Sand, in 6 fathoms, with Southwold Church tower bearing S.W. by W. $\frac{1}{2}$ W.; Covehithe Church tower W. $\frac{1}{2}$ N.; and Kessingland Church tower N. by W.

BARNARD NORTH BUOY, chequered black-and-white, with staff and ball, is laid on the N.E. end of the Barnard Sand in $3\frac{1}{2}$ fathoms, and lies with South Newcome buoy N.E., and Kirkley South Mill touching Lowestoft Church N. by E. $\frac{1}{4}$ E.; Pakefield lighthouse N. $\frac{3}{4}$ W.; and S.W. Barnard buoy S.S.W.

The Pakefield Gatway having opened more to the southward and westward, the South Newcome buoy has been moved to the southward, and now lies as hereafter mentioned. The best course through the Gat is now N.N.W. and S.S.E.; in this line of bearing are $3\frac{1}{2}$ fathoms.

Pakefield lighthouse is situate on the south part of the cliff, a mile to the south-westward of

Pakefield Church; it is a white tower, 30 feet high, on which is a fixed red light, elevated 68 feet above the level of the sea, and is visible 3 leagues off, between the buoys of Pakefield Gat. This light is intended to lead vessels between the Barnard and Newcome Sands, into and out of the Lowestoft South Roads.

Shoals and Buoys, &c., in the vicinity of Lowestoft and Yarmouth.

LOWESTOFT NEWCOME is a *ridge of sand*, lying in a S.W. by S. and N.E. by N. direction, and forming the western side of the Stanford Channel, and the eastern side of the Lowestoft South Road; its southern end being about a mile distant from the Lowestoft shore, and its northern end rather more than $\frac{1}{2}$ a mile from the Ness Point.

INNER LOWESTOFT SHOAL lies between the entrance to Lowestoft Harbour and the South Ness, at about $\frac{1}{3}$ of a mile from the shore; it has on it from 11 to 15 feet. A black buoy has been placed on its south-western edge.

LOWESTOFT INNER CHANNEL.—Vessels from the southward may use the Lowestoft Inner Channel, where buoys have been placed for their guidance; these consist of four *black* buoys on the western edge of the Newcome, which, in proceeding northward, are to be left on the starboard or eastern side; and the Inner Shoal black buoy may also be left on the starboard side, having 17 feet at low water within them.

South Newcome Buoy (black, with staff and ball) lies in $2\frac{3}{4}$ fathoms at low water, with Lowestoft Mill in a line with the west end of the Pier Hotel N. by E.; North Barnard buoy S.W.; Pakefield lighthouse N.W. $\frac{1}{2}$ N.

Stanford Light-vessel, which carries two fixed lights, placed horizontally, 23 feet above the sea, visible 3 leagues distant, lies with Corton Church and windmill in one, N. $\frac{1}{2}$ W.; Pakefield windmill, in line with the northernmost house in Pakefield; and Lowestoft high light N.N.W. $\frac{1}{2}$ W.

LOWESTOFT NEW HARBOUR.—Between Pakefield and Lowestoft is the entrance to this harbour, being nearly $\frac{1}{2}$ a mile to the south-westward of the low lighthouse. This harbour is formed by Lake Lothing, now connected with the sea on the east, and by means of new cuts and canals westward, with the rivers Waveney and Yare, thus communicating with the city of Norwich, by which means it is now enabled to receive vessels of 200 tons burthen.

At Lowestoft New Harbour a red light is shown all night on each pier-head, and two green lights are shown at the entrance of the Inner Harbour.

LOWESTOFT LIGHTS.—At Lowestoft two lighthouses are erected, the higher one on the cliffs in lat. 52° 29′ 10″ N., and long. 1° 45′ 30″ E.; the lower one on the beach; they bear N. $\frac{3}{4}$ E. and S. $\frac{3}{4}$ W. from each other, distant 1,013 yards; showing two fixed lights all night, at the respective heights of 119 and 42 feet.

STANFORD CHANNEL.—In the early part of 1843, from the recent alterations which had then been for a considerable time in progress in and about the Newcome and Holm Sands, having rendered the Stanford Channel again navigable, notice thereof was given that the Corporation of Trinity House had caused the said channel to be buoyed out by four buoys, as follow: — One black on the tail of the Holm Sand, lying in $2\frac{1}{4}$ fathoms, with Pakefield Church midway between Pakefield Mill and a red-tiled house, W.N.W.; Stanford light-vessel N. $\frac{3}{4}$ E.; and Holm Hook N.N.E., and the east Newcome buoy red. The above two buoys mark the southern entrance of the channel, and lie a little more than half a mile apart; the other buoys are the Holm Hook, chequered black-and-white, on the eastern side of the channel; and the N.E. Newcome, red on the western side.

Mariners are to observe, that the tides in the Stanford Channel set N.E. and S.W., and that the light-vessel in this channel must always be passed to the eastward. The course to enter the channel from the southward is to bring the light-vessel N.N.E., until between the two southern buoys, when N.E. by N. will lead through.

The HOLM and CORTON SANDS lie to the eastward and northward of the Newcome and the Stanford Channel. The Holm is a *large sandy flat*, which dries in some parts, and joins an extensive bank, called the Corton. These sands stretch along in a direction parallel to the shore, full 7 miles, and form the eastern boundary of Lowestoft and Corton Roads. Several parts of the Holm dry at low water.

On the west side of the Holm and Corton are four black-and-white chequered buoys; and on the eastern side are four black buoys (in addition to the one marked "South Holm," and described before), the latter are laid down, with the following marks and bearings, viz.:—

Middle Holm (black), in 8 fathoms, with Lowestoft Mill in line with the northernmost house at Lowestoft, bearing N.W. by W. $\frac{1}{2}$ W.; Nelson's Monument in line with the highest mill west of Yarmouth, N. $\frac{1}{4}$ W.; and South Corton Buoy N.E. by N.

South Corton (black), in 4 fathoms, with Lowestoft Mill in line with the north part of Lowestoft Battery, west; Gorleston North Mill in line with Yarmouth south pier-head, N. by W. $\frac{1}{2}$ W.; and S.E. Corton buoy N. $\frac{3}{4}$ E.

S.E. Corton (black), in 6 fathoms, with the chancel end of Gorleston Church in line with the pilot-house on the south pier-head, N.N.W.; Lowestoft Windmill apparently midway between Lowestoft Church and a grove of trees, W. by S. $\frac{1}{2}$ S.; and N.E. Corton buoy north.

N.E. Corton (black), in 5 fathoms, with Lowestoft high light S.W. by W., and the S.E. Corton buoy south, distant $1\frac{1}{4}$ mile.

The chief passage into YARMOUTH ROADS, for ships of great draught of water, has always been between the Corton Sand, on the western side, and St. Nicholas Bank, or Kettle Bottom, on the eastern side, generally called St. Nicholas Gat. It has lately been ascertained that the depth of water in this channel has considerably decreased; and the Hewett's Channel is now used.

St. NICHOLAS BANK, or KETTLE BOTTOM, is a *long narrow sand*, about $1\frac{1}{4}$ mile in length from south to north, having on it from $2\frac{1}{4}$ to 3 fathoms, and marked out by two buoys and a light-vessel.

St. NICHOLAS LIGHT-VESSEL shows a bright fixed light, and lies in 10 fathoms at low water, spring-tides, at the north end of St. Nicholas Sand, with St. Peter's Church in line with the Royal Hotel, N.W. $\frac{1}{2}$ N.; north mill at Gorleston, its width to the northward of Nelson's monument, W.N.W.; and Gorleston south mill in line with the north end of the harbour-master's house, W. $\frac{1}{4}$ S.

HEWETT'S GATWAY.—This channel is between the St. Nicholas and Scroby Sands, $\frac{1}{2}$ a mile in width at its northern, and $\frac{3}{4}$ of a mile at its southern boundary, with from 6 to 9 fathoms, in a N. $\frac{1}{2}$ W. and S. $\frac{1}{2}$ E. bearing, which is marked out by the St. Nicholas light-vessel and outer Kettle Bottom black buoy, on the port or western side, and by four buoys of the Scroby on the starboard or eastern side of the channel. When midway between the South Scroby and Outer Kettle Bottom black buoy, a north course will take you through the Hewett Channel into Yarmouth Roads.

South Scroby (a large black beacon nun-buoy) lies in $3\frac{1}{2}$ fathoms, with the chancel end of Lowestoft Church bearing S.W. $\frac{1}{2}$ W.; Southern Mill at Old Town, on with the northern end of the Naval Hospital, N.W. $\frac{3}{4}$ N.; and Scroby Fork buoy N. by W.

DIRECTIONS FOR SAILING FROM ORFORDNESS TO YARMOUTH ROADS.

VESSELS proceeding from Orfordness towards Yarmouth, should Bring Bawdsey Cliff well open of Orford beach, bearing W.S.W. $\frac{3}{4}$ W., until Aldborough Church bears N.N.W.; then steer directly N.E. $\frac{1}{4}$ N., about 16 miles, or until the lighthouses of Lowestoft appear in a line, bearing N. $\frac{3}{4}$ E.; this course will take them between Aldborough Knapes and the Ridge and Sizewell Bank, and to a fair berth off Covehithe Ness, distant $2\frac{1}{2}$ miles. If you are going outside the sands through Hasborough Gat, continue N.E. $\frac{1}{4}$ N. from off Orfordness, 27 miles; this will take you without the Holm Sand, to where Lowestoft high light bears west in 16 fathoms water; from thence steer N.E. by N., 12 miles; this will take you without the Cross Sand, to where you will have the Newarp light-vessel bearing N.N.W., distant 3 miles. You may now steer more northerly towards the light, and round it, according to circumstances.

On turning to windward, you may stand in-shore to 9, 8, and 7 fathoms, and off to 12 or 14 fathoms, the soundings being regular; but do not bring the lower light of Orfordness to the westward of W.S.W., lest you should run on the Knapes; observe also, not to bring the said lighthouse to the southward of S.W. $\frac{1}{2}$ W., or you may approach too near the Sizewell. The leading-mark taking you through between these shoals, is Orfordness lights in one, bearing S.W. by W. $\frac{1}{4}$ W. By night, when bound northward, to avoid the Ridge, you must not bring the high light to the southward of W. by S. $\frac{1}{2}$ S., until you have passed it nearly $3\frac{1}{2}$ miles, for the shoalest part of the bank lies nearly E.N.E., $2\frac{1}{2}$ miles from the high light. These precautions will also be necessary when bound to the southward; for by keeping the lights in one, after passing the Sizewell, will take you within the Ridge; to avoid which, the high light should be opened to the southward of the low light in time. Blythborough Lodge N. $\frac{1}{2}$ W. open to the northward of Dunwich Church, clears the north end of the Sizewell.

ALDBOROUGH BAY lies between the Ridge and Sizewell. A *sandy flat* runs off the shore: but there is good anchorage with off-shore winds, in 7, 8, or 9 fathoms, Orfordness low light bearing S.W. $\frac{1}{2}$ W., and Aldborough Church N.W. by W. $\frac{3}{4}$ W.

Orford Church and the ruins of the castle a sail's breadth open either way, will clear the Knapes to the eastward or westward; Iken Church, midway between Slaughden House and the Martello tower, N.W. $\frac{1}{4}$ W., will clear it to the southward; and Leiston Church on or open of Thorpe House, N.W. by N., nearly, will clear it to the northward. Between the Ridge and Aldborough Knapes are 9, 10, and 11 fathoms, sandy bottom.

The shore about Thorpe Ness is rocky. Between it and the south end of Sizewell Bank are 9, 12, and 15 feet; thence towards the north end of the shoal, are from 3 to 4 fathoms, excepting the shoal of 9 feet. Orford Castle open to the southward of Aldborough town clears the Sizewell Bank to the eastward.

Covehithe Church well open to the eastward of the low N.E. end of Easton Cliff, will clear it from the northward, and Aldborough Church open of Thorpe Ness, will clear it from the southward.

SOUTHWOLD, or SOLE BAY, lies between the Sizewell and the Barnard. The anchorage there is good, with off-shore winds, in 8 and 9 fathoms, within $\frac{1}{2}$ a mile of the shore; but in approaching the Barnard, you must not get into less than 9 fathoms water, for its edges are steep, and there are 8 fathoms close to its eastern side. To lead clear of this end of the Barnard, keep Southwold Church at least twice its apparent breadth to the left of Easton Houses, which stand within Easton Cliff.

The anchorage in Yarmouth Roads is extensive, and there is room for any number of ships; the ground is sandy, and ships in heavy gales from the N.N.E. and S.S.W., are sometimes apt to bring home their anchors.

TIDES.—It is high water at Yarmouth, on the full and change of the moon, at 9h. 15m.; and the spring-tides rise 6 feet, but the flood stream continues to run to the southward till $\frac{1}{2}$ after 10h. At Lowestoft it is high water on the shore at 9 o'clock; the tides rise $7\frac{1}{2}$ feet, and the flood-stream runs till $\frac{1}{2}$ after 10h. At Orfordness it is high water at 11h. 15m.; springs rise 8 feet, neaps 5 feet.

NOTE.—As the soundings in approaching the coast from sea to the northward of Lowestoft are very irregular, and the soundings off Lowestoft so regular that they may be depended on, ships, when coming from seaward, should endeavour to make the land in the latitude of Lowestoft, which is 52° 29′ north. In this latitude they may steer boldly in by night or day, until they come into 17 or 16 fathoms; for in the night-time the high light may be seen 6, and the low light 3 leagues; and in day, the church and upper part of the town may be discerned at the distance of 7 leagues, if the weather be clear.

FROM YARMOUTH AND ORFORDNESS TO THE DOWNS.

Description of the Sand-Banks, &c.

In this outer track are some *dangerous shoals*, namely:—The *Inner* and *Outer Gabbard*, the *Galloper*, the *Four Mile Knolls*, the *Falls*, the *Long Sand*, and *Kentish Knock;* the two latter may be considered connected with the sands that so greatly impede the entrance to the Thames, but the others are separated, and lie at a considerable distance from them.

The INNER GABBARD is a *shoal*, about $6\frac{1}{4}$ miles in length, lying N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S., having on its shallowest part 2 fathoms at low water. This is about the extent of 2 miles in the central part of the shoal, but on the other parts are from 3 to 9 fathoms. Upon the central part a black buoy is placed, with Orfordness high light N.N.W. $\frac{1}{2}$ W., distant about 15 miles; the South buoy of the Shipwash W.N.W. $\frac{3}{4}$ W., 12 miles; the Sunk light-vessel W. $\frac{1}{2}$ S., about 18 miles; and the Galloper light-vessel S. by W. $\frac{1}{2}$ W., 11 miles. It is steep-to, and at $\frac{1}{2}$ a mile distance, on each side, there are from 13 to 16 fathoms.

The OUTER GABBARD.—About 4 miles to the eastward of the Inner is the Outer Gabbard, a *narrow shoal*, of about $3\frac{1}{2}$ miles in length, but divided into two parts by a narrow swashway. This shoal lies N.N.E. and S.S.W., and has from 9 to 3 fathoms on it; the north end bearing S.E. $\frac{1}{4}$ E., distant $18\frac{1}{2}$ miles from Orfordness high lighthouse. A buoy, striped red-and-white, is placed on this *shoal*, in the least water, at about a mile from its N.N.E. end, with Orfordness lighthouse bearing N.W. $\frac{1}{4}$ W., distant $18\frac{3}{4}$ miles; the South buoy of the Shipwash W. $\frac{3}{4}$ N., 18 miles; the Sunk light-vessel W. $\frac{1}{2}$ S., $24\frac{1}{2}$ miles; and the Galloper light-vessel S.W. $\frac{1}{4}$ S., 14 miles. This *shoal* is also steep-to; and there are from 15 to 17 fathoms within $\frac{1}{2}$ a mile of it all around. The buoys of the Inner and Outer Gabbards bear from each other nearly east and west, distant 6 miles.

There is a constant rippling of the tide over both these shoals, excepting at slack water, by which their situations may be readily known, should the weather be so hazy as to prevent the buoys from being seen. Between the Inner Gabbard and the Galloper there are from 13 to 15 fathoms water.

The GALLOPER is a *very dangerous shoal*, having on some places not more than 8 feet at low water. It extends 5 miles N.E. and S.W., from 7 fathoms at each end, and is not a mile across at the broadest part, which is near the middle. This part lies S. by E. $\frac{1}{2}$ E. from the high light at Orfordness, distant 23 miles; E.S.E. $\frac{1}{2}$ E. from the buoy on the Long Sand Head, distant 13 miles; E. by N., 13 miles from the Kentish Knock light-vessel; and N.E. by E. $\frac{1}{2}$ E., 31 miles from the North Foreland lighthouse. The shallow part of this sand extends full 3 miles, having only $1\frac{1}{4}$, 2, 3, or in some spots, 4 fathoms. The sea commonly ripples over it. Near the south-west end a light-vessel is moored, in 15 fathoms, from which are exhibited two fixed lights, placed horizontally, on two separate masts, elevated 36 feet above the level of the sea. This vessel bears about S.W. by W. $\frac{1}{4}$ W., 2 miles from the before-mentioned shoalest part of the sand, and lies in latitude 51° 45′ north, and longtiude 1° $55\frac{1}{2}$′ east. About $\frac{3}{4}$ of a mile to the south-eastward of the light-vessel lies a black buoy, which will point out the usual position of the vessel, should it be removed by any accident.

The light-vessel bears from Orfordness high light S. $\frac{3}{4}$ E., 24 miles; the North Foreland lighthouse N.E. by E. $\frac{1}{2}$ E., $28\frac{3}{4}$ miles; and from the Long Sand Head buoy S.E. by E. $\frac{1}{2}$ E., 12 miles.

The tide here flows, full and change, till $\frac{3}{4}$ after 11h., running nearly 3 knots. The flood commences from the N.E., then E.N.E. The channel between the Galloper and the Long Sand Head is about 12 miles wide, and has from 20 to 17 fathoms in it, shoaling gradually as you approach the Long Sand Head. On the east side of the Galloper are 12, 16, 18, and 20 fathoms; at 3 miles' distance are 27 fathoms, coarse sand, with small black stones; near to the south end are 14 fathoms, the ground stony; about $\frac{3}{4}$ of a mile outside the north end are 14 fathoms, with coarse stones, and close to this end are 9, 8, and 7 fathoms.

On the chart of the Thames, a *new shoal* is laid down, extending S.W. $\frac{1}{2}$ S., 5 miles, from 9 fathoms at each end, on which are some *patches*, with only 4 and $4\frac{1}{2}$ fathoms. The northern one lies S.S.W., about $3\frac{1}{2}$ miles from the buoy of the Galloper. S.W. by S. from this spot is *another*, with similar depth, about $\frac{3}{4}$ of a mile distant. The soundings, at about $\frac{1}{3}$ a mile from the east side, are from 19 to 14 fathoms, and on the west side rather more. The distance between the north end of the shoal and the south end of the Galloper is above 2 miles, with 16 to to 20 fathoms.

These *shoals* are called in Captain Hewett's survey, the *Four Mile Knolls*, and are situated on and connected with the North Falls, and continue in a S.W. $\frac{3}{4}$ S. direction, having on them 7, 9, and 10 fathoms, to the latitude of 51° 35′, where it deepens to 13, 14, 12, and 17 fathoms, and turns in a S.W. by W. direction to the latitude of 51° 28′, where commences what may be termed the South Falls: these stretch down to the latitude 51° 13′, and are scarcely more than a mile across in any part, the shoalest water being $4\frac{1}{2}$ and 5 fathoms, and this in the latitude from 51° 22′ to 51° 17′, about $6\frac{1}{2}$ miles to the eastward of the Goodwin light-vessel, and between which there are from the Falls, 24, 28, 30, then 13, 12, and 10 fathoms to the light-vessel.

THE LONG SAND extends to the northward so far as 51° $45\frac{1}{2}$′ north, where it terminates in a point about $\frac{3}{4}$ of a mile broad, having $4\frac{1}{2}$ fathoms near it; this point, called the Long Sand Head, bears from the Galloper light-vessel N.W. by W. $\frac{3}{4}$ W., distant $13\frac{1}{2}$ miles; from the Gunfleet beacon S.E. by E. $\frac{3}{4}$ E., $8\frac{1}{2}$ miles; and from the south buoy of the Shipwash S. by W. $\frac{1}{2}$ W., distant 8 miles. Close to the eastward of the Sand Head are 5 and 6 fathoms, deepening suddenly to 8 and 9 fathoms The Naze Tower bearing N.W., will lead clear through Goldmer's Gat, and past the Long Sand Head, in 9 and 10 fathoms.

The KENTISH KNOCK is a *dangerous* and *extensive shoal*, lying in nearly a S.W. and N.E. direction, its length being 7 miles, and its broadest or middle part 2 miles; its N.E. end bears from the Galloper light-vessel W. $\frac{1}{2}$ N., distant 12 miles, and from the Long Sand Head buoy, S. by W. $\frac{3}{4}$ W., distant 5 miles; its S.W. end bears from the Galloper light-vessel W. by S., distant 16 miles, and from the North Foreland lighthouse N.E. $\frac{1}{2}$ N., 14 miles. A few small spots on this sand, in latitude 51° $39\frac{1}{2}$′ N., dry 1 foot at low water, and the whole of it is shallow, with from 3 to 6 feet, though in some places there are 2 and 3 fathoms.

KENTISH KNOCK LIGHT-VESSEL.—This vessel is moored on the east side of the sand, a short distance to the eastward of the situation in which the beacon-buoy formerly laid. The light on board this vessel is exhibited from a single lantern; it revolves every minute, and burns at an elevation of 37 feet above the level of the sea. This vessel is furnished, with a ball at the mast-head; but, in addition thereto, it is surmounted by a second ball, of smaller size, whereby she may be with certainty distinguished, under all circumstances, during the day-time.

This light-vessel bears from the Galloper light-vessel W. $\frac{1}{4}$ S., 10 miles; from the North Foreland lighthouse N.E. $\frac{1}{4}$ E., 20 miles; and from the Sunk light-vessel S.S.E. $\frac{1}{2}$ E., 10 miles.

Close to the south-eastern side of the sand, which is steep-to, are 5, 6, 8, and 9 fathoms, the ground generally soft and muddy; very near its northern extremity are 10 and 11 fathoms; and between it and the Long Sand, 8, 9, 10, and 12 fathoms. There is a passage between it and

the Long Sand, 2¼ miles wide; but no vessel must attempt to run through without the greatest necessity.

Kentish Knock Watch Buoy coloured black-and-white, in stripes, lies W. by S. ½ S., 1¾ mile from the light-vessel, in about 5 fathoms water.

Kentish Knock South Buoy.—A large nun-buoy, coloured red, marked "K.K." in conspicuous black letters, and surmounted by a staff and globe, has been placed in 12 fathoms at low water, spring-tides, off the south end of the Kentish Knock Sand; with the Kentish Knock light-vessel N.E. by E., distant 6½ miles; Tongue light-vessel W. by S., 10¼ miles; and North Foreland lighthouse S.W. ¼ S.

Note—A small nun-buoy, painted red, and having "KK." on it in white letters, has also been laid in 7 fathoms water, ¾ of a mile N.W. by N. from the before-named large buoy.

The GOODWIN LIGHT-VESSEL exhibits three bright lights, on separate masts, at 42 and 28 feet above the level of the sea; it lies N.E., nearly 2 miles, from the nearest part of the North Sand Head that dries at low water, in 10 fathoms, with the North Foreland lighthouse N.W. ¾ N., 6¼ miles; Ramsgate Pier light-house N.W. by W. ¾ W., 6⅓ miles; and the South Foreland high light S.W. by W. ¼ W., 13⅔ miles.

In order to distinguish these lights from the two Foreland lights, they are exhibited in such a manner, that the middle light appears considerably higher than the two extreme lights, forming an erect triangle, so that they can never be mistaken; and in foggy or hazy weather, a gong is constantly struck on board of her, to warn ships that they are near the North Sand Head.

BUOYS on the EAST SIDE, or BACK of the GOODWIN.—First—Off the N.E. part of the sands, a large nun-buoy, coloured red, and bearing a staff with a triangular top, in 11 fathoms, with St. Lawrence Church, on with the Royal Hotel at Ramsgate, N.W.; Upper Deal mill, on with the south side of the Naval Hospital, W. ½ S.; South Foreland high lighthouse S.W. by W. ⅞ W.; North Foreland lighthouse N. by W. ¾ W.; and Gull light-vessel W. by N.

Second.—A nun-buoy, of a large size, and painted black, marked "Swashway," and surmounted by a staff, and having a diamond top, has been placed on the south side of the projection of the sand, near where the safety beacon stood.

This buoy lies in 15 fathoms water, with the following marks and bearings:—

Upper Deal Church, just open to the right of Deal Castle, W. by N.; St. Lawrence mill N.N.W. ¼ W.; the new beacon on the Goodwin Sand W.N.W.; South Calliper buoy S.W. ¾ W.; Gull light-vessel N.W.; N.E. Goodwin buoy N. by E. ¾ E.; and Godwin light-vessel N.N.E. ¼ E.

Third—Off the northern part of the South Calliper, a large nun-buoy, surmounted by a staff and cage, and painted black-and-white in horizontal stripes, in 13 fathoms, with Waldershare Monument, in line with the centre of the low cliff north of Kingsdown, W. by N. ¼ N.; South Sand Head light-vessel W. by S.; and S.E. Calliper black buoy S.W. by W. ½ W.

Fourth—Off the southern part of the spit of the South Calliper, a large black nun-buoy, bearing a staff and globe, in 8½ fathoms, with St. Lawrence Church N. ½ W.; Shakspeare's Cliff just open of the South Foreland W. ½ S.; South Sand Head light-vessel W. ¾ S.; and South Calliper striped buoy N.E. by E. ½ E.

Note.—Masters of vessels, pilots, and others are cautioned to give the above-mentioned buoys a berth of not less than ½ a mile in passing them, on account of the tide, which sets with great strength to the north-westward, towards and over the sand.

Goodwin New Beacon.—In 1851, a new beacon was completed on the Goodwin Sands. It is situated on the south side of the Swashway, upon the North Calliper, where the sand rises about 4 feet, with the Swashway black buoy bearing E.S.E., distant ¾ of a mile; Goodwin light-vessel N.E. by N.; North Foreland lighthouse N. ½ W.; Gull Stream light-vessel N.W. ½ N.; but it is probable that this beacon will not stand.

DIRECTIONS FOR SAILING FROM YARMOUTH TO ORFORDNESS AND THENCE TO THE DOWNS, &c.

Vessels proceeding from Yarmouth Roads for Orfordness, must run out through Lowestoft Roads and Pakefield Gat, or through the Stanford Channel; and when they have passed to the southward of all the buoys, steer S.W. ¼ S., 6 leagues, which course will take them between the Sizewell and Knapes, taking care, when abreast of Orfordness, to clear the Ridge and Nathaniel's Knoll, until they get Bawdsey Cliff well open of Orfordness beach, coming no nearer to the Ridge than 9 or 8 fathoms, (see page 11) which latter mark will take them into Hollesley Bay. But if directly bound for the Downs, bring Orfordness high light to bear west, distant 4 miles, and a S. by W. ½ W. course for 24 miles, will carry you abreast of the N.E. point of the Kentish Knock; then steer S.W., 21 or 22 miles, and you will be at the

entrance to the Gull Stream. Or they may pass through the Hewett Channel, and having brought Lowestoft high light to bear west, distant 4 miles, may steer S.S.W. $\frac{1}{2}$ W., 48 miles, to the above position off the Kentish Knock: this course will carry outside the Knapes, and between the Shipwash and the Gabbards.

In steering the above courses across the Kent, according to the winds, allowance must be made for the tide, whether ebb or flood.

From Hollesley Bay to the Downs.—Vessels sailing from Hollesley Bay for the Downs, with an easterly wind, commonly turn down towards Orfordness with the ebb-tide; and having passed the eastern buoy of the Whiting, turn south-easterly. Bring the high light N. by W., which mark will lead clear to the northward of the Shipwash; and when they have passed the light-vessel off the North Ship Head, about $1\frac{1}{2}$ mile, they will fall into the track above mentioned, and may steer S. by W. $\frac{1}{2}$ W., 21 miles, which will lead to the eastward of the Kentish Knock.

In sailing near the Shipwash, be careful to make proper allowance for the tide; and with contrary winds you may stand toward the Shipwash into 12 or 14 fathoms, and off into 17 or 18 fathoms; towards the Long Sand Head into 9 or 10 fathoms, and off into 20 fathoms: towards the Knock into 12 or 13 fathoms, and off into 16 or 18 fathoms; and when you are in a line between the Kentish Knock light-vessel and the Galloper light-vessel (which bear E. $\frac{1}{4}$ N. and W. $\frac{1}{4}$ S. from each other) steer directly S.W. for the Gull Stream, the leading-mark through which is, the South Foreland upper light S.W. $\frac{1}{4}$ W.

TIDES.—It is high water at the Long Sand Head, at the full and change of the moon, at half an hour after 11h.; springs rising 15 feet, neaps about 10. At the North Foreland at 11h. 15m.; springs rising 10 feet, neaps 7. The flood sets over the Shipwash W.S.W., and the ebb E.N.E., so that vessels passing from the Gunfleet to the Long Sand Head, must have it nearly on their beam; during the 2 first hours' of the flood it sets W. by S. between the Long Sand Head and the Kentish Knock, and also between the Long Sand and the Sunk, with great velocity; while the ebb runs equally rapid in the contrary direction.

To the northward of the North Foreland, without the Margate Sand east buoy, the first of the flood sets S. by W., at quarter-flood S.W., at half-flood west, and last quarter N.W. and N. by W.; first of the ebb sets N.E. by N., at half-ebb E.S.E., and latter part of the ebb, S.S.E. and south.

From YARMOUTH ROADS to FLAMBOROUGH HEAD.

Description of the Land.

The coasts of Suffolk and Norfolk are low, but Foulness and the adjacent land is a perpendicular cliff, which, at Mundesley, is 50 and 60 feet high; from thence it is level, with few exceptions. Near Hunstanton it is cliffy, and rises 80 feet; and Flamborough Head is a remarkable and magnificent cliff of white stone, with a lighthouse on its summit.

YARMOUTH TO FOULNESS.

*Description of the Shoals, Buoys, &c.**

SANDS.—The road before Yarmouth is encompassed by various sands, which occasionally shift, and alter their dimensions. Besides those already described, two branches run off to the northward of St. Nicholas Bank, having deep water between them; the outer or eastern bank forms the Cross Sand and Newarp, and the inner or western shoal is the Scroby. There is also a *narrow bank*, which runs off to the north-eastward of the Scroby, called the *Sea Heads*. To the westward of the Scroby and Sea Heads is the *Barber* and farther north the *Cockle Bank*. The passage commonly used, to and from Yarmouth Roads, is between the Scroby and Sea Heads on one side, and the Barber and Cockle on the other. This passage is commonly called the Cockle Gat.

---

* Particular description and directions are given with the coasting charts, for the Yarmouth Roads, as well as for Lynn Deeps, the River Humber, and other inshore navigation, which require the charts on the larger scales than the general chart of the North Sea, which this book is intended to accompany.

The CROSS SAND lies about 1⅓ mile to the eastward of the Scroby, and is 6 miles in length, from 4 fathoms at each end, and the breadth, under 4 fathoms, does not exceed ¾ of a mile in its broadest part. About ½ a mile northward of the buoy, on its south end, is a *narrow ridge*, running N.N.E. and S.S.W., ¾ of a mile. At 1¼ mile N.N.E. from the latter shoal, another *shoal patch* commences, and runs in the same direction 1¼ mile farther, having from 6 to 9 feet on it. Near the shoalest part of this, the Middle Cross Sand buoy is placed; on the other parts there are generally from 3 to 4½ fathoms at low water. Three buoys are now placed on the eastern edge of this sand, with the following marks and bearings:—

Cross Sand South Buoy is now a black can-buoy, of the ordinary size, laid in 9 fathoms at low water, with Yarmouth Old Church N.W. ¾ W.; Middle Cross Sand Buoy N.E. ¾ N.; the southernmost Mill at Gorleston in a line with the pilot's house on the pier W. ½ N.; and Lowestoft Church S.W. ¾ W.

Cross Sand Middle Buoy (black) lies in 11 fathoms, with Yarmouth old Church, W. by N.; Winterton lighthouse N.N.W. ¾ W.; North Cross Sand buoy N.N.E. ½ E.; and South Cross Sand buoy S.W. ¾ S.

North Cross Sand Buoy.—This additional large nun-buoy, painted *red*, and surmounted by a staff and globe, is placed on the N.E. extremity of the Cross Sand, and nearly in a line with the two black buoys previously on that sand, and about 3 miles from the northernmost, or Middle Cross Sand buoy; it lies in 5 fathoms, with Winterton lighthouse N.W. ¾ W.; Yarmouth old Church W. by S. ½ S.; Middle Cross Sand buoy S.S.W. ½ W.; and Newarp light-vessel N.N.E.

North Cross Sand Knoll Buoy.—A *knoll*, having 3 fathoms water over it, has grown up about a mile N. by E. from the North Cross Sand buoy; a buoy *striped red-and-white*, has been laid in 4 fathoms water, just to the eastward of the said knoll, with Newarp light-vessel N.N.E.; the lighthouse at Winterton N.W. by W. ½ W.; and Cockle light-vessel W. ½ N.

The NEWARP is another *dangerous bank*, the flat of which commences at the North Cross Sand buoy, and runs nearly N.N.E., 4½ miles to the light-vessel. You may cross this flat in 7 and 9 fathoms, with Winterton Church W.N.W. The Newarp is a *shoal*, of 2½ and 3½ fathoms, of small dimensions; and on the flat, which runs about a mile to the northward of it, is a red buoy, and to the north-eastward of the buoy a light-vessel.

Newarp Buoy (red) lies in 6 fathoms, with Newarp light-vessel E. ½ N., ¾ of a mile.

NEWARP LIGHT-VESSEL exhibits three bright fixed lights, upon separate masts, elevated 36 and 22 feet above the water, and visible 10 miles off. During the day this vessel will be easily distinguished, by carrying three balls—one at each mast-head. It is moored in 19 fathoms, and lies E. ½ N., ¾ of a mile from the Newarp buoy, with Winterton Church steeple, bearing W. ½ N.; Hasborough lower lighthouse just open to the northward of the high light; Hasborough Church steeple N.W. ¼ W.; and Yarmouth Church steeple S.W. by W.

The SCROBY lies to the northward of St. Nicholas Bank, or Kettle Bottom, being separated from it by the Hewett Channel; and is divided into three parts, which dry at low tides, named the North, South, and Middle Scroby. Its length from north to south is 7½ miles, and is 1½ mile at its broadest part. Many parts of this sand are nearly dry at low water, and on the edge 3 and 3½ fathoms, with 5 or 6 fathoms close to the sand.

COCKLE LIGHT-VESSEL.—A floating light-vessel has been moored on the eastern side of the Cockle Gat, at the northern entrance into Yarmouth Roads and mariners are to observe, that a bright revolving light will be exhibited on board the same.

WINTERTON LIGHTHOUSE is painted red, and shows a fixed light, visible 14 miles.

HASBOROUGH LIGHTS are 137 and 100 feet above high water, each showing a fixed light, visible 18 and 15 miles; buildings N.W. ¼ W. and S.E. ¼ E., half a mile apart, coloured white.

CROMER LIGHTHOUSE is 274 feet above high water, shows a revolving light every minute visible 22 miles, building white.

FOULNESS BUOY red, is laid on the outer part of Foulness Spit off Cromer, in 3 fathoms, with Hasborough high light S. by E. ¾ E.; Cromer lighthouse W. ½ S.; and Beeston Church tower W. by S. ¾ S.

Winterton Ness.—A buoy, striped black-and-white, has been placed in 4 fathoms water, with the following marks and bearings, viz.:—Winterton Church S.W. ½ S.; Winterton lighthouse S.S.W. ½ W.; and Cockle light-vessel S. by E. ¾ E.

Off Winterton Ness is a *narrow shelf*, with 4 to 9 feet over it, 1¼ mile in length, extending S. by E. ½ E., and N. by W. ½ W., its outer edge being nearly half a mile from the shore.

HASBOROUGH GAT is situated between the Newarp and Sea Heads, which lie to the south-westward, and Winterton Ridge, Hammond's Knoll, and Hasborough Sand, to the north-eastward; it is about 7 miles wide, and in depth from 10 to 20 fathoms. The Newarp buoy and light-vessel will be on the west or port side, and the black beacon-buoy, on the Hasborough Sand, on the east or starboard side, going to the northward.

HASBOROUGH SAND stretches from a black beacon-buoy at its south end, to a buoy, quartered black-and-white, at the north end, in a N.N.W. direction, more than 10 miles, and is, generally speaking, about a mile broad, from 4 fathoms on one side to 4 fathoms on the other, at its widest part, being in some places nearly dry at low water spring-tides. This sand is

steep-to, on both sides, having from 5 to 7 fathoms close to its edges, and at $\frac{1}{4}$ of a mile distance from 13 to 15 and 16 fathoms water, which renders the lead of essential utility to ships standing in from sea. Near the south end, on the eastern side, it is somewhat shallower and irregular; and N.N.E. from the south black beacon-buoy, is a *narrow ridge* growing up, and extending $3\frac{1}{2}$ miles, over which are $4\frac{1}{2}$, 6, and 8 fathoms.

HASBOROUGH SAND SOUTH BEACON BUOY is black, and lies in $4\frac{1}{2}$ fathoms water, directly at the southern extremity of the sand, with the Newarp light-vessel bearing S. $\frac{1}{2}$ W., distant $6\frac{1}{2}$ miles; Winterton lighthouse S.W. $\frac{1}{2}$ W., $9\frac{1}{4}$ miles; Hasborough high lighthouse W. by N. $\frac{1}{4}$ N., 11 miles; and Cromer lighthouse N.W. $\frac{3}{4}$ W., 19 miles.

MIDDLE HASBOROUGH BUOY, black-and-white, in circular stripes, lies near the middle of the sand in 6 fathoms at low water, with Hasborough Church W. by S. $\frac{1}{2}$ S.; Hasborough light-vessel N. by W. $\frac{1}{2}$ W.

HASBOROUGH SAND NORTH BUOY, quartered black-and-white, lies in 6 fathoms, with Cromer lighthouse bearing W. by N., distant 12 miles; and Hasborough high lighthouse S. W., 9 miles. Between this buoy and the shoal part of the sand, which bears from it about S. by E., distant a mile, there are 2 to 4 fathoms.

HASBOROUGH LIGHT-VESSEL is moored off the northern extremity of the Hasborough Sand, exhibiting 2 fixed lights, raised on separate masts, 38 feet high. This vessel is moored in $15\frac{1}{2}$ fathoms, with Cromer lighthouse W. by N.; Hasborough high lighthouse S.W. $\frac{1}{2}$ S.; and the northern buoy of Hasborough Sand east, distant $1\frac{1}{2}$ mile. The lights may be seen 10 miles off.

HAMMOND'S KNOLL is a *narrow ridge*, running nearly in a similar direction to the Hasborough Sand. S.E. by E. $\frac{1}{2}$ E., 4 miles from the black or south beacon-buoy on Hasborough Sand, is the southern extremity of this sand, in 6 fathoms; it hence extends N. by W. $\frac{1}{2}$ W., $6\frac{1}{2}$ miles, where there is a depth of $7\frac{1}{2}$ fathoms; both ends then gradually sink to seaward, and lose themselves in the deep water. On the shallowest part, which is about $2\frac{1}{2}$ miles in length, are from 3 to $3\frac{1}{2}$ fathoms; the eastern edge is very steep-to, having from 8 to 10 and 12 fathoms close to it. Between the southern end and the black beacon-buoy of Hasborough Sand, are from 9 to 16 fathoms.

The WINTERTON RIDGE is a *shoal* lying to the south-eastward of Hammond's Knoll; it is about 4 miles long, and $\frac{1}{4}$ of a mile broad, in a N. $\frac{1}{2}$ W. and S. $\frac{1}{2}$ E. direction, with only 2 fathoms over its shallowest part. At its north end are 6 fathoms, and towards its south extremity 5 fathoms. Its south end bears S.E. $\frac{1}{2}$ S., distant nearly 9 miles from the black beacon-buoy of Hasborough Sand; and east, $6\frac{1}{4}$ miles from the Newwarp light-vessel. This shoal is steep-to, especially on the eastern side. Between the north end of the Ridge and the south end of Hammond's Knoll (which are distant nearly 2 miles) the depths are from 9 to 12 fathoms.

SMITH'S KNOLL.—The middle of this bank, on which are only $2\frac{1}{2}$ fathoms, lies with Yarmouth Church bearing W.S.W. $\frac{1}{2}$ W., distant about 8 leagues; the light-vessel at the north end of the Newarp W. $\frac{3}{4}$ S., $13\frac{1}{2}$ miles; and Winterton light W. $\frac{1}{4}$ S., $20\frac{1}{2}$ miles; its northern end N.E. by E.; and its southern end E. $\frac{1}{4}$ S. from the same. The extent of the bank is 19 miles in length, and $\frac{3}{4}$ of a mile in breadth. It is steep-to on the eastern side. From the depth of 4 fathoms, $\frac{3}{4}$ of a mile to the eastward, are 27 fathoms; and $\frac{3}{4}$ of a mile farther 25 fathoms, coarse brown sand, with black speckled stones.

The general soundings between Smith's Knoll and the Ridge, are from 15 to 20 fathoms of fine brown-reddish sand, with blue clay.

About S.W., 5 miles from the northern end of Smith's Knoll, there is a *shoal*, of from 5 to 7 fathoms, and between that and the Ridge, another of similar depth; but the water all about them is from 16 to 20 fathoms. These are now called the Hewett Ridges. There are also other *banks* to the northward, called the *Leman* and *Ower*, &c., which we shall describe hereafter.

THE TIDES at the south end of this knoll run $2\frac{1}{2}$ miles with spring, and a mile at neap. Towards the north part of the shoal they set almost north and south. At the south end and middle N.N.E. and S.S.W., the latter part of the flood drawing round to the westward; but the ebb to the eastward. Both are much governed by the prevailing winds; a westerly wind often retards the run of the flood to the westward, while it accelerates the ebb to the east, and on easterly winds the contrary.

DIRECTIONS FOR SAILING THROUGH HASBOROUGH GAT, ETC.

COMING from seaward, and proceeding for Hasborough Gat, the first object to be attended to by day or night, will be to make the light-vessel off the north end of the Newarp; when in sight of her, do not bring her to the eastward of north; or if you make her to the eastward of north, steer to the eastward till you bring her to bear N.N.W., before you come nearer than 3 or 4 miles of her; if, with an ebb-tide, she bears N.N.W., then you may safely steer for her, as the ebb sets nearly in that direction. Having the light-vessel bearing N.N.W., distant 3 miles, you may run north 2½ miles, when you will be abreast of her, bearing about west; from hence continue your course N.N.W. ¾ W., for 23 miles, until you get Cromer light to bear S.W. by W., distant 4½ miles.

SAILING OUT OF HASBOROUGH GAT.—Being off Hasborough, and night approaching, a vessel may run out through the Hasborough Gat with the greatest safety, by bringing the two lights of Hasborough in one, bearing N.W. ¼ W.; thence steering to the S.E. ¼ E., and keeping them on, will lead to the Newarp light-vesssel. The eastern side of the Newarp bears S. by W. ½ W. from the light-vessel; therefore, in rounding this light, and hauling to the southward, you must not bring her to the eastward of north, or N. by W., till you have passed the light 3 or 4 miles; when you may steer a S.S.W. ½ W., or S.W. by S. course, which will take you outside the Cross and Holm Sands.

In rounding the light-vessel, if you have a half-flood in your favour, and a commanding breeze, you may safely steer S.S.W.; for the flood setting to the S.S.E., will keep you clear of the Newarp; but be careful with an ebb-tide (which sets in a contrary direction) of hauling up too soon, as it will drift you towards the sands, and without a favourable breeze, you may be obliged to anchor.

Should the wind be from the E.N.E., it will be safer to borrow to windward of the lights in one. You may haul up as soon as the high light of Hasborough bears W.N.W. (for the south end of Hasborough Sand bears from that light E.S.E. ½ E.); this will enable you to keep a better offing, in order to round the light-vessel, which is a safe guide for clearing the Newarp.

Should the gale be heavy from the eastward, and you have not day-light sufficient to secure Yarmouth Roads, or the fetching to windward of the light-vessel is improbable, it is then recommended to anchor off Hasborough, with the lights about W. by S., a league from the shore, or nearly half-way towards the sand, in 10 or 12 fathoms, where the gat is entirely open, rather than run off Winterton; for, in the former berth, you will find considerable shelter from Hasborough Sand, but in the latter you will be quite exposed.

From Winterton Ness to Foulness the land runs about N.N.W., 17 miles, and nearly in the same direction stretches Hasborough Sand; near the north end of which is the light-vessel. In coasting along the shore, the soundings are regular—5, 6, 7, and 8 fathoms; farther out are 10, 11, 12, and 14 fathoms; therefore, in turning to windward, you may stand towards the shore into what depth you please, and off to 14, 15, or 16 fathoms; but should you deepen your water to 20 or 23 fathoms, and then decrease to 18, be careful and put about, for when in that depth you will be close to Hasborough Sand. The channel between this sand and the shore is, in most parts, about 8 miles wide, and is called the Would.

In a fairway off Hasborough, with the lights bearing S.S.W., you will have 8 to 9 fathoms, full 4 miles from the land, which depth extends about 1½ mile, having 14 to 15 fathoms on either side of it; on its edges are sometimes ripplings.

E. ¼ S., 1½ mile from Hasborough high light, lies a *small knoll*, with 4½ fathoms on it. Ships, in passing this knoll, should not approach any nearer to the shore than 7 fathoms. As there are not less than 7 fathoms on the ridge, commanders of ships need not avoid it, unless the swell of sea happens to be very high; nor need they, when in the fairway, be alarmed at their quickly coming from 12 to 15 fathoms into 8 or 9 fathoms. A *sandy flat* lines the shore all the way from Winterton to Foulness.

But as you approach Foulness you should give the shore a berth, and not get into less water than 9 fathoms, the bottom being *rocky* and *foul* a mile out.

TIDES.—At Yarmouth it is high water at 9h. 15m., full and change, and spring-tides rise 8 feet, neaps 6. Outside the sands the flood runs until half-past 10h. Through Hasborough Gat the flood sets S.S.E., a little southerly, ending at half-past 10h., while the ebb sets contrary. With strong springs, its velocity will be 3½ miles an hour, one tide carrying a vessel 4 leagues, moderate springs full 3 leagues, and neaps about 2 leagues. Outside of Hasborough Sand its does not run with so much rapidity, the flood setting more southerly. On Hasborough Sand the water rises about 10 feet at springs. Off Hasborough it is high water at 7h. 40m., spring-tides rising 11, and neaps 7 feet; but the flood-stream continues running to the southward until 10h. 15m. Near Foulness it is high water at 7h., the flood-stream running until 10h. 15m., springs rising 14, and neaps 8½ feet. Near Winterton Ridge it is high water at 7h. 50m., the flood-stream running southward till 10h. 30m.; spring-tides rise 10 feet, and neaps 6 feet.

SHOALS LYING TO THE EASTWARD AND NORTHWARD OF HASBOROUGH SAND, AND BETWEEN FOULNESS AND FLAMBOROUGH HEAD.

Description of the Sands, Buoys, &c.

WE have already noticed two patches of shoal water to the north-westward of Smith's Knoll which, with others scattered about, render the navigation of these parts, particularly between Yarmouth and Flamborough Head, extremely hazardous for ships of a heavy draught of water, except with neap tides, or very mild weather.

The LEMAN and OWER are *two dangerous shoals*, which appear to have increased of late, and now have not more than 5 feet water over them in some places; they lie nearly parallel to each other, the inner one, called the Leman, being about 7½ leagues from the opposite coast.

The LEMAN extends in an irregular form, about 15 miles, from N.N.W. ½ W. to S.S.E. ½ E. Its southern extreme, in 4 fathoms, is in latitude 53° 2′ 50″ north, and longitude 2° 7′ 45″ east. Its northern extreme, latitude 53° 10′ 5″ north, and longitude 1° 50′ east.

From the south end of the Leman, in 4½ fathoms, Hasborough high light bears W. ¾ S., 25½ miles; Hasborough light-vessel W. ¾ N., 19½ miles; and Cromer lighthouse W. ¾ N., 30 miles. From its north end, Hasborough high light bears S.W. ½ W., 23½ miles; Hasborough light-vessel S.W. by W. ¼ W., 14½ miles; and Cromer lighthouse W.S.W. ¾ W., 23½ miles, nearly.

It is high water on the Leman, on full and change of the moon, at 6 o'clock.

The OWER is by far more dangerous and irregularly formed than the Leman, and has its southern extreme (4 fathoms) in latitude 53° 8′ 30″ north, and longitude 2° 4′ 10″ east; and its northern extreme, at the same depth, in latitude 53° 15′ 0″ north, and longitude 1° 50′ 0″ east.

The southern extreme of the Ower bears from that of the Leman, north, and is distant 5 miles; the northern extreme of the Ower is from that of the Leman N.N.E., 5 miles; and the shoal patch of the Ower bears from that of the Leman, (and which are the nearest part of the banks) N.E. ¾ N., 3 miles.

From the north end of the Ower, Hasborough high lighthouse bears S.W. ¼ W., 28 miles; Hasborough light-vessel S.W. ½ W., 19 miles; and Cromer lighthouse W.S.W., 27 miles.

It is high water on the Ower, on full and change of the moon, at half-past 6 o'clock.*

LEMAN AND OWER BUOYS.—*Two buoys* are placed on these shoals. The Leman buoy (red) is in 5 fathoms at low water, and bears from the light-vessel N.W. by W., distant 6 miles. The Ower buoy (black) is in 5 fathoms, and bears from the light-vessel E. by S., distant a mile.

The LEMAN and OWER LIGHT-VESSEL is moored between the sands in 16 fathoms water, in latitude 53° 8′ 30″ north, and longitude 2° 1′ 30″ east, with the shoalest part of the Ower bearing N.N.W. ¾ W., distant 5 miles; and the shoalest part of the Leman W.N.W. ¼ W., distant about 5 miles. The lights are exhibited on 2 masts, the foremost of which revolves, and burns at an elevation of 38 feet above the water; whilst the aftermost is a fixed light, and burns at an elevation of 27 feet above the same level. Mariners are to

* These sands are fully delineated on the larger scale charts, and described in the copious sailing tions which accompany them.

observe, that the above are only placed as warning lights, to indicate the position of these *dangerous shoals;* and that the light-vessel is not to be approached in any direction, either by night or day. This vessel carries a ball on each mast head.

To the eastward of the Ower are three similar *ridges*, called the Well Bank, the Broken Bank, and the Swarte Bank. The nearest to the Ower is the Well Bank, the least water upon which is 3 fathoms, being distant from the Ower $3\frac{1}{2}$ miles. The Broken Bank lies about 3 miles to the north-eastward of the Well Bank, with from 5 to 7 fathoms; and the Swarte Bank nearly 5 miles further in the same direction with from 6 to 9 fathoms. Between each of these banks, as well as the Leman and Ower, the depths are from 12 to 20 fathoms.

HADDOCK BANK.—About 11 miles N.W. by W. from the northern part of the Ower, and 23 miles N.E. from Cromer lighthouse, lies the southern end of the *Haddock Bank*, a shoal having 3 fathoms on its shoalest part, with 4, 5, to 9 fathoms on the flat surrounding it. Near it, on each side, are from 10 to 14 fathoms; and between it and the Ower, from 15 to 20 fathoms.

N.E. $\frac{1}{4}$ E. from Cromer lighthouse, distant 12 leagues, is the Coal Pit, sinking from a depth of 11 and 12 fathoms to 24 and 34 fathoms. N.N.W., 12 miles from the Coal Pit is the Sole Pit of greater extent, and deepening from a similar depth to 30 and 43 fathoms.

SHERRINGHAM SHOAL.—This is a *narrow ridge of sand*, lying in a N.W. $\frac{1}{2}$ W. and S.E. $\frac{1}{2}$ E. direction, being about $4\frac{1}{4}$ miles in length, and having from 2 to $3\frac{1}{2}$ fathoms over its central part. A black buoy is placed at its eastern end, in 4 fathoms, for which the marks are, Cromer lighthouse south, 7 miles; Blakeney Church W. $\frac{3}{4}$ S., 9 miles; and the village of Lower Sherringham S.W. by S. The body of this shoal is situated $5\frac{1}{2}$ miles from the shore; and between them is a good channel, with 8, 10, 9, 7, 6, and 5 fathoms water.

POLLARD.—About 8 miles N.W. $\frac{1}{4}$ N., from Cromer lighthouse, and between the N.W. end of Sherringham Shoal and the shore, is the *Pollard, a small patch*, with 3 and $2\frac{1}{2}$ fathoms over it: all round it are 5, 6, and 7 fathoms. Its inner edge is $1\frac{3}{4}$ mile off the shore, having a good channel on either side.

BLAKENEY HARBOUR is considered the best on this coast, and forms a good retreat for vessels, during a heavy gale, blowing toward the shore. Its church may, in clear weather, be seen so far as the Dudgeon light, from which it bears S. by W. $\frac{1}{4}$ W., distant 17 miles.

WELLS HARBOUR.—This place having recently been much improved, now forms another place of safety in gales of on-shore winds. Its entrance is $5\frac{1}{4}$ miles N.W. by W. from that of Blakeney, where lies the fairway buoy, painted red.

Wells Harbour is nearly dry at low water; but spring-tides rise 16 and 18 feet. It is high water on the bar at 6h. 20m., at full and change; but the tide runs to the eastward for 3 hours longer: be therefore, very particular in attending to the tides. About 2 miles off the mouth of the harbour, are some overfalls, of 2 and $2\frac{1}{2}$ fathoms; but between them and the buoys, are 4 and 5 fathoms.

In WELLS ROAD, or HOLKHAM BAY, vessels may find anchorage, in 3 fathoms, bringing Wells Church to bear S. by E.: Holkham Church S.W. $\frac{3}{4}$ S.; and the north part of the Scald Heads W.N.W., distant $1\frac{1}{4}$ mile from the shore. The Scald Heads are a range of small sand hills, somewhat remarkable. To the northward also, of this anchorage, about $\frac{1}{2}$ a mile, is good riding, in 4 or 5 fathoms, the ground holding well.

Hunstanton light is 109 feet above the level of high water, showing a fixed light visible 13 miles, and appears red between the bearings of E.S.E. and S.E. by E.

Lynn Well light-vessel shows 2 fixed lights at an elevation of 34 feet above the sea, and visible at the distance of 10 miles.

LYNN DEEPS is that open space bounded on the north by the Long Sand, and on the south by the Roaring Middle, Sunk, Middle, and Woolpack.

BLAKENEY OVERFALLS.—The eastern end of these overfalls lies about $4\frac{1}{2}$ miles W. by N. from the west end of Sherringham Shoal, with Kelling and Salthouse Churches in one, bearing S. $\frac{1}{2}$ E., having at their eastern end 4 fathoms; and thence extending N.W. by W. $\frac{1}{4}$ W., until they join the eastern part of the Burnham Flats: these, as well as Sherringham Shoal, lie in a direction nearly parallel to the shore. About $1\frac{1}{2}$ mile from the eastern end is a *patch*, of only 9 feet water. It then deepens again to 3 fathoms, for the space of a mile, where a *knoll* commonly called the *Knock*, rises up, $\frac{1}{2}$ a mile in length, with only 9 feet water over it: the shoalest part lies directly N. by W. $\frac{1}{4}$ W., distant 7 miles from Blakeney Church, and about 4 miles from the shore. At 3 miles from hence to the westward, is another *small spot* of *shoal water*, with only 10 or 11 feet over it, being the westernmost of what may be called Blakeney Overfalls. Here they are joined by the Burnham Flats.

Close to the outer edge of these overfalls are 5, 6, 7, and 8 fathoms; farther out are 10 fathoms; and within them are 6, 7, and 8 fathoms (coarse sand with black specks), gradually decreasing towards the shore. Between Blakeney and Sherringham Overfalls are 7 and 10 fathoms.

The DUDGEON.—A light-vessel lies 24 miles N. by W. from Cromer lighthouse, carrying one light in the night-time, and riding a little to the westward of the Dudgeon Shoal, in latitude 53° 15′ north, and longitude 0° 56′ east. This shoal lies N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{2}$ E., being nearly 3 miles in length, and a mile in breadth. There are 12 feet on the shoalest part,

which is N.E., about a mile from where the vessel is stationed. On the other parts of the shoal are from 3 to 3½ and 4 fathoms. To the southward the depth increases; and at the extremity of the shoal are 6 fathoms. A black buoy is placed on the western edge of the shoal, about a mile E.N.E. of the light-vessel.

The NORTH RIDGES commence ¾ of a mile N.W. of the north end of the Dudgeon, between which is a channel, with 4½ and 5 fathoms in it. These are *three narrow ridges*, lying north and south of each other, and run in a N.W. and S.E. direction. They are 2 miles in length, with only 3, 3½, and 4 fathoms on them at low water, but becomes deeper in the channels between them. With the light-vessel bearing S. by E. ½ E., distant 4 miles, you will have only 3 fathoms water on the north side of these ridges; and with this bearing you will pass over them all in their shoalest parts.

As these shoals lie very much in the way of ships of a heavy draught of water, the Dudgeon light-vessel should not be brought to the southward of S.E. by S., when you are between the distances of 2 and 4½ miles from it. You will have 10 fathoms water at a mile to the westward of the shoals, which gradually shoal to 4½ fathoms as you approach near to them. There are several other *patches*, about 3 miles north-westward of the North Ridges, with 3½ to 5 fathoms on them. Large ships should, when near low water, pass to the eastward of the Dudgeon Shoal.

RACES BANK lies to the west and S.W. of the Dudgeon, about 5 miles, Blakeney Church bearing from its south end S. ½ W.; Cromer light S.S.E.; and Holkam Church nearly S.W. ½ S.

This shoal is narrow, and at present is about 2¾ leagues long, lying in the direction of north, for 3 miles, from the S.E. buoy; it then runs N.W. ½ N., for nearly 6 miles, to the N.W. buoy, shallowing to 1½, 2, 2½, and 3 fathoms at its southernmost end. Between it and the Dudgeon are 6, 8, 10, and 11 fathoms, except *two narrow patches*, which lie W. by N. ½ N., nearly 4 miles from the Dudgeon light-vessel, and nearly a mile from the Races Bank. These patches are nearly a mile in length, and run E.S.E. and W.N.W., and have only from 3¼ to 4 fathoms on them.

Two buoys have been placed on this shoal, viz.:—on its N.W. end a RED buoy, in 7 fathoms at low water, the light-vessel at the Dudgeon bearing therefrom E.S.E., distant about 7 miles; and on its S.E. end, a WHITE buoy, in 5 fathoms at low water, the Dudgeon light-vessel bearing therefrom N.N.E. ½ E., distant about 6 miles; and Blakeney Church S. ¾ W.

The OUTER DOWSING.—The Outer Dowsing is a shoal lying in a N. by W. and S. by E. direction 19 miles, the south end of which extends 3 miles N.N.E. and S.S.W., with from 5 to 7 fathoms on it. This part of the bank is about ½ a mile broad. There is a *small patch*, with only 4½ fathoms on it, which lies in latitude 53° 17′ 30″, and longitude 1° 16′ east.

A *bank*, of 8 and 9 fathoms, about a mile in breadth, runs to the northward from the south end, having 14 fathoms on its western side, and 11 and 12 on its eastern; and connects the south end with the northern portion of the Outer Dowsing, which is a narrow strip of shoal ground, lying in a N. by W. and S. by E. direction, 12 miles, commencing about 5 miles from the south end; the northern portion has from 2, 3, 4, and 5 fathoms upon it, deepening from 7 to 9 on its eastern and western sides.

The INNER DOWSING northern end lies 36 miles N.N.W. ¼ W. from Foulness; 14½ miles N.W. ½ W. from the Dudgeon light-vessel; 22 miles S. by E. ¾ E. from the Spurn; and 10 miles S.E. by E. ½ E. from Trusthorpe Church. It thence extends 6 miles S. by W. ½ W., and is about ½ a mile broad. The least water on this sand is 4 feet, close to it on the west side, are 8 to 10 fathoms; and near the east side are 8 fathoms. The south end lies 9 miles E. by S. from Ingoldsmel Church; between which are 10, 9, 8, 6, and 4 fathoms. Between the Inner Dowsing and the Dudgeon light-vessel are 9, 12, 10, 14, 10, and 7 fathoms.

A black beacon-buoy, having a staff and ball, is placed on the N.E. end of this sand, in 3¾ fathoms at low water.

INNER DOWSING OVERFALLS lie about a mile N.W. by W. from the black beacon-buoy on the north end of the Inner Dowsing. They consist of 4 or 5 *small patches*, and are about ¾ of a mile in extent each way. These patches are *dangerous* as they have only 12 feet on them in some parts, with 6, 7, and 8 fathoms all round them, and that depth close-to. Trusthorpe Church bears from their centre N.W. by W. ¼ W., 9 miles. In the channel, between these patches and the Inner Dowsing, are 8 and 9 fathoms.

A *shoal* also lies about ¼ of a mile to the eastward of the south end of the Inner Dowsing, with only from 3 to 3½ fathoms upon it. It runs N.N.E. and S.S.W., 1¾ mile, and is about ⅓ of a mile broad.

A ship bound to the southward by this channel, should pass within a mile to the westward of the Docking chequered-buoy, in 12 or 13 fathoms. From thence a S.W. by W. course, 15 miles (allowing for the tide), will take you between the Burnham Ridge and Lynn Knock, to the light-vessel in Lynn Well.

The DOCKING SAND.—The north end of this sand lies E. ¾ S., 4 miles from the south end of the Inner Dowsing: and west, 2 miles, from the red buoy on the north end of the Race's Shoal, and has a chequered black-and-white buoy upon its northern extremity. This buoy lies in 9 fathoms, with the Hunstanton lighthouse S.W., 18 miles; and Ingoldsmel Church

W. by N., 13 miles. The south-western point of this sand lies about $\frac{3}{4}$ of a mile from the north point of Burnham Flats; between which is a swashway, of 5 and 6 fathoms. Near the northern part of the sand are only 7 or 8 feet water. The southern part of the Docking shoal is an *extensive triangular flat*, having upon it from $1\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, except a *patch* near its S.W. point, which nearly dries at low water. This spot lies N.E. by E., $1\frac{1}{4}$ mile from the red beacon-buoy on Burnham Flats. From the chequered buoy at the north end of the Docking the shoal extends S. W., 5 miles. This side of the shoal is *very dangerous*, as the lead gives you no warning; for you will have 9 to 11 fathoms close to the bank. The S.W. side of the shoal runs S.E. $\frac{1}{2}$ E. and N.W. $\frac{1}{2}$ W., nearly 6 miles; and its N.E. side runs nearly N. by W. $\frac{1}{2}$ W., 7 miles, to the chequered buoy near the north point. The two latter sides of the shoal are not so dangerous to approach as the former.

The channel between the Race's Bank and the Docking is only about 2 miles wide at the north end, between the buoys; but as you go to the southward, it is full 3 miles wide.*

To the northward of Lynn Deeps, towards the Humber, there are several *overfalls* and *sandy flats;* these are the *Trusthorpe, Theddlethorpe, Saltfleet, and Protector Overfalls*, the *Rosse Sand*, and the *Sandhaile Flats*.

TRUSTHORPE OVERFALLS lie from east to E.S.E., nearly $3\frac{1}{4}$ miles from Trusthorpe Church, with only $3\frac{1}{4}$ fathoms over them at low spring-ebbs. They consist of *four patches*, having 5 and $5\frac{1}{2}$ fathoms between them.

THEDDLETHORPE MIDDLE lies full 3 miles to the southward of Saltfleet, and about $1\frac{1}{2}$ mile from the shore, to which it runs parallel. Close to its eastern side are $3\frac{1}{2}$ fathoms; but over the sand are no more than 3 feet at low water: and the passage between it and the main is only fit for boats.

THEDDLETHORPE OVERFALLS.—These are *several patches*, lying nearly E.S.E. from Theddlethorpe Church, about 3 miles distant from the shore, and have 3 and $3\frac{1}{2}$ fathoms over them.

SALTFLEET OVERFALLS consist of *several patches*, with from $2\frac{1}{4}$ to $3\frac{1}{2}$ fathoms on them, with 5 and 7 fathoms between them. They bear from Saltfleet from E. by S. $\frac{1}{2}$ S. to S.E. $\frac{1}{2}$ E. The outer part of these shoals lies 5 miles from the land.

The ROSSE SAND commences near Saltfleet, and from thence runs N.N.E., $3\frac{1}{2}$ miles, to near the Sandhaile Flats, and has only 1 and 2 feet upon it. Its northern end lies E.S.E., 3 miles from Donna Nook beacon. There are 10 or 12 feet water within it; but at its southern end there is scarcely a passage for a boat at low water. Along the eastern edge of this sand are from 10 to 18 feet water.

PROTECTOR OVERFALLS.—The north end of these shoals lies with Saltfleet, bearing W.N.W., nearly, distant 8 miles. From thence they run south, 2 miles, and are about $\frac{1}{2}$ a mile broad, with from 9 feet to 3 fathoms on them. From the patch of 9 feet, Saltfleet bears N.W. by W. $\frac{1}{2}$ W., distant 8 miles; Trusthorpe Church W. by S. $\frac{1}{2}$ S., 7 miles; and the beacon-buoy on the north end of the Inner Dowsing S. by E. $\frac{1}{2}$ E., 8 miles; and the Silver Pits, in 40 fathoms, bear from E. by N. to E.S.E., $8\frac{1}{2}$ miles; between which is an *extensive flat*, with from 6 to 9 and 10 fathoms, when you fall suddenly into from 40 to 50 fathoms, when in the latitude of Saltfleet, at 16 miles from the land.

These overfalls are dangerous at low water, and lie very much in the way; therefore, a ship should not approach the land, when in this neighbourhood, within 3 leagues; and when you are beating in thick weather, you should take your soundings from the Silver Pits, when you will be certain of your distance from them. About a mile south of the south end of the above shoal, are *two more patches*, of 3 and $3\frac{1}{4}$ fathoms, about $\frac{1}{2}$ a mile in extent. A north course from the Inner Dowsing buoy, will carry you to the eastward of these shoals.

The SILVER PIT is an extensive deep, of irregular form, lying about N.E. and S.W., 22 miles, with a depth of from 20 to 52 fathoms; the centre of the deepest part being in latitude 53° 28′.

SANDHAILE FLATS is an *extensive shoal*, running out 5 miles from the Lincolnshire coast. Its northern edge lies in a north-easterly direction from Saltfleet Church, and its south-eastern extremity, in 4 fathoms, bears E. by N. from the Saltfleet windmill, distant $5\frac{1}{2}$ miles, and about S.S.E. from the high lighthouse at the Spurn. Patrington Church, clear of the Spurn Point sand-hills, bearing N. by W. $\frac{1}{4}$ W., will lead over the eastern part of the flat, in 3, $3\frac{1}{2}$, and 4 fathoms; from hence it bends circularly to the northward and westward, so far as the entrance to Tetney Haven, and to Clea Ness, thereby forming the western boundary of the entrance to the Humber.

A red-and-white buoy has been placed on the pitch of the Sandhaile, with the Spurn high lighthouse bearing N. by W. $\frac{1}{2}$ W.; the New Sand light-vessel N.E. $\frac{1}{2}$ E.; and the Donna Nook beacon S.W. $\frac{3}{4}$ W.

DONNA NOOK BEACON.—On a point of land N. $\frac{1}{2}$ E., $3\frac{1}{2}$ miles from Saltfleet, is a beacon, of conical form, with a triangular top, painted red, 50 feet high, and may be seen, in clear weather, more than 3 leagues off. Near this beacon is a life-boat house.

* Further directions are given, with the particular Charts for Lynn and Boston Deeps.

The entrance to the River Humber is bounded to the southward by Sandhaile Flats (already described), and to the northward by the Stone Banks, or Binks, New Sand, and South Knoll, or Chequer Sand. Two remarkable lighthouses are erected on the Spurn Head, which can be seen at a considerable distance, and sufficiently point out the mouth of the river.

Spurn Lighthouses are situated on the Spurn Point; elevated 93 and 54 feet above the level of high water, each showing a fixed light, visible 15 and 11 miles. The high lighthouse is coloured red. The low light is now to the N.W. of the high light.

The STONE BANKS, called also the *Outer* and *Inner Binks*, are hard *rocky shelfs*, running out from the Spurn Land, with a narrow but shallow channel between them. These *Banks* consist of *three* or *more knolls*, of 3 and 6 feet water, having some parts which occasionally appear above water: they are distinguished by the names of the *Inner*, *Middle*, and *Outer Bink;* the Inner Bink lies S.S.E. from the high lighthouse, and almost joins the Spurn Point; the Middle Bink is separated from the Inner Bink by a swashway, of 3 to 6 feet water. Upon this bank are *two patches*, which often dry, while adjacent to them there is not above a foot at low water. This bank lies directly to the eastward of the Inner Bink, from which it is distant about $\frac{1}{4}$ of a mile. The Outer Bink has from 6 to 12 feet over it, and lies E. $\frac{1}{2}$ S. from the high lighthouse, distant 3 miles. To go clear to the eastward of this bank, bring Dimlington Heights well open, and their highest part to bear N. by W. $\frac{1}{2}$ W. On the southern and eastern edges of these sands, or binks, there are three black buoys, the middle one having a staff and ball.

The Outer Bink buoy lies with the New Sand light-ship bearing S. $\frac{1}{2}$ W.; the Spurn high light W. by N. $\frac{1}{2}$ N.; the Middle Bink buoy W. $\frac{1}{2}$ S.; and Kilnsey beacon N. by W. $\frac{1}{2}$ W.

The NEW SAND is to the south-eastward of the Stone Banks. E. by S. of the New Sand are *some spots*, of 3 and 4 fathoms, and with the ebb-tide strong ripplings extend in that direction full 2 miles from the buoy, so far out as 7 fathoms; but beyond that is a channel, of 10, 12, 15, and 17 fathoms, running to the southward of the light-vessel and Chequer Bank. At $\frac{1}{4}$ of a mile on the outside of the black-and-white buoy of the Chequer are 9, 10, and 12 fathoms.

The SOUTH KNOLL, or CHEQUER BANK is a *square patch*, lately grown up to the south-westward of the New Sand, and lies directly in the channel way, the least water over which is, at present, about 19 feet at low spring-ebbs. A chequered black-and-white buoy is laid there, with the following marks:—The Spurn high light bearing N.W. by N., distant $2\frac{1}{2}$ miles; and Kilnsey Church (now in ruins) N. $\frac{3}{4}$ E.

In the night a red-coloured light is shown from the high lighthouse, between the bearings of N.W. by W. and N.N.W. $\frac{1}{2}$ W., a sector comprehending the New or Chequer Shoal. On the last bearing the red light disappears, and the bright light comes again in sight.

THE SPURN OR NEW SAND LIGHT-VESSEL is moored in 9 fathoms water, distant rather more than $4\frac{1}{4}$ miles from the Spurn high lighthouse, with Dimlington cliff N. $\frac{3}{4}$ W., $6\frac{1}{2}$ miles; Kilnsey Church N. by W. $\frac{1}{2}$ W., $4\frac{1}{4}$ miles; the chequered buoy on the South Knoll W. $\frac{1}{2}$ S.; and the Spurn high light N.W. by W. In this vessel a bright light revolves every $\frac{1}{2}$ minute, which may be seen 9 miles.

BRIDLINGTON, or BURLINGTON BAY is encumbered with a *sand*, called the *Smithic;* its N.E. end lies a mile S.W. by S. from the point, or extremity of Flamborough Head. It thence takes a S.W. direction for 3 miles, becoming broader as you advance; so that its western part is more than 3 miles in breadth. The shoalest part of the Smithic is of a forked shape, with from 10 to 15 feet on it at at low water, spring-tides, one of the prongs running W. by S., $3\frac{1}{2}$ miles; and the other S.W., 3 miles. There is an opening between these, a full mile wide, with $3\frac{1}{2}$ and 4 fathoms in it. The shoalest part is near its N.E. point, and has only 10 feet on it. From this spot Flamborough lighthouse bears N.E. $\frac{3}{4}$ N.; and the pier-heads W.N.W., $3\frac{1}{10}$ miles. There is *another shoal*, of 12 feet, near its S.W. end; this lies with Owburn bearing W. $\frac{1}{2}$ N., distant $1\frac{1}{2}$ mile; and the pier-head N. $\frac{1}{4}$ E., the same distance.

Above a mile to the southward of the Smithic, and in-shore of it, is an *extensive flat*, with not more than $3\frac{1}{2}$ and 4 fathoms on it at low water; but to the northward of the Smithic there is a channel, which runs from the head in a W.S.W. direction, with 6 and 7 fathoms in it.

SMITHIC NORTH BUOY.—Near the N.E. end of the Smithic a red buoy has been moored, in $4\frac{1}{2}$ fathoms, with Bridlington Church bearing N.W. by W. $\frac{3}{4}$ W. and Flamborough lighthouse N.N.E. $\frac{3}{4}$ E.

SMITHIC SOUTH BUOY, chequered black-and-white, is placed in 4 fathoms at low water, with Flamborough New Mill touching the north end of a hedge-row N. by E. $\frac{1}{2}$ E.; Flamborough Head lighthouse N.E. $\frac{3}{4}$ N.; Burlington Church N.N.W $\frac{1}{2}$ W., and Carnaby Temple N.W.

FLAMBOROUGH LIGHTHOUSE, in latitude 54° 7′ north, longitude 0° 5′ west, is erected on Flamborough Head, 400 yards distant from its extreme point, and close to a bluff point of land on the south side of Silex Cove—the only landing-place near the head. The light is revolving, having 3 faces, of 7 reflectors each; and in order to distinguish it from Cromer and Tynemouth revolving lights, which show a face every minute, one face

appears illuminated every 2 minutes; of these, the colour of the one is red; and the lights from that face being diminished, will not, in hazy weather, be visible so far as the others; therefore, when in such cases only two faces are seen, the interval of time will be regularly 2 minutes and 4 seconds, alternately, which will sufficiently distinguish it from any other light.

DIRECTIONS FOR SAILING FROM FOULNESS TO THE RIVER HUMBER AND FLAMBOROUGH HEAD.

THE shores from Foulness towards the Humber are, in many parts, *foul* and *rocky* particularly off Cromer, Sherringham, and Weybourne; which places must therefore be attended to, and have, in coasting along, a good berth given to them.

Small vessels taking their departure from Foulness, and bound into the Humber, should go to the westward of the Dudgeon light-vessel, steering N.N.W. $\frac{1}{4}$ W. from abreast of Foulness, when bearing S.S.W., about 6 miles distant; and having passed the vessel, a N.N.W. $\frac{1}{2}$ W. course will take them to the Humber; but should you wish to go to the eastward of the Dudgeon shoal, then sail from Foulness N. $\frac{1}{2}$ W., about 7 leagues from the before-mentioned position (Cromer S.S.W., 6 miles), and thence N.W. $\frac{1}{2}$ N., 9 leagues, which will bring you near the spurn light-vessel; but the mariner must be particularly attentive to the set of the tides, which will be noticed hereafter.

TIDES.—It is high water, full and change, at the Spurn, at 15m. after 5 o'clock; but the flood-stream runs until $\frac{1}{2}$ after 5h. It is low water at 40m. after 11h.; and the ebb-stream runs until 12 o'clock. On the Sandhaile, and at Grimsby, it is high water at 6h. In Hull Road, the time of high water is 6h. p.m.; but the flood-stream runs until a $\frac{1}{4}$ after 6h. It is low water at 20m. after 12h.; but the ebb runs till 40m. after 12h.

At the Spurn Point springs rise 23 feet, neaps about 14 feet. At Hull, springs rise 22 feet, neaps 13 feet. The variation in the Humber is nearly $2\frac{1}{4}$ points west. The flood runs across the mouth of the river, $\frac{3}{4}$ of hour before it turns inward, and then sets across towards the Lincolnshire shore, W.S.W. Between the Spurn and Clea Ness it sets N.W., the ebb being contrary. Round the Spurn and through the Hawk, and across the Trinity Sands, the flood sets N. by W.; while the ebb-tide makes down the Hawk, long before it comes high water on the shore. Between the Bull and Clea Ness Sand the flood sets northward, and ebb southward; and both ebb and flood set strongly across the Foulholm and Skitter Sands.

In proceeding along the coast of Yorkshire, there is no danger, until you reach Bridlington Bay. The shore is lined with churches, which may be seen at a considerable distance. The general direction of the land, from Dimlington cliffs to Hornsey, a distance of 6 leagues, is N. $\frac{3}{4}$ W. From thence it turns more northerly, winding gradually to the eastward to Flamborough Head, thus forming a semicircular cavity, named Bridlington, or Burlington Bay.

Vessels sailing from the mouth of the Humber and having the Spurn light-vessel bearing N.W. by N., distant about $1\frac{1}{2}$ mile, may shape a course N. $\frac{1}{2}$ E. for 37 miles, which will carry them clear of Flamborough Head; or from inside the Dudgeon light-vessel may steer N. $\frac{3}{4}$ W., 64 miles to the same position, or with a large ship, and coming to the eastward of the Dudgeon, may haul up N. by W. $\frac{1}{4}$ W., and fall into the same track. There is deep water everywhere in your passage; and no danger until you get near the head, from which rocky ground runs out 2 or 3 cables' length.

Flamborough Head is a most remarkable object, of great height, and snowy whiteness. On it is erected a conspicuous lighthouse.

General Description of the Tides between Cromer and Scarborough.

LEMAN and OWER.—The tide on the eastern sides of the Leman and Ower runs in a variety of directions. It is high water, full and change, at 6h. 30m., but the stream runs southward 3 hours longer. Spring-tides rise 13 feet, neaps 8. Here the

first of the flood will set N. by E., then turn S.E. for the greater part of the tide, and changes, when near high water, to S. by W., when it runs with its greatest strength in that direction for an hour after; then veers round to the westward, and at low water it runs N. ½ E., in its full force, 2 miles an hour.

DUDGEON.—At the Dudgeon it is high water at 6 o'clock, but the stream continues to run till ½ after 7 o'clock, the flood running south, and ebb north. At 10 miles N.N.W. from the Dudgeon the flood sets S.S.W., and ebb the contrary.

OUTER DOWSING.—On its northern side the tides set variously; thus the first quarter will run S.W. by W., half-flood, S.E. by S., and near the latter part of the flood E.N.E.; the ebb the contrary.

Between Foulness and Blakeney it is high water, on shore, at ½ after 6 o'clock. Spring-tides rise 20 feet, neaps 13 feet; but with strong northerly winds it will increase to 4 fathoms over the bar. The flood continues to run to the south-eastward until 20m. after 9h.

In Wells Road it is high water, full and change, at 6h. 20m. Spring-tides rise 18 feet. The flood-stream continues to run to the eastward until 9 hours.

Between Wells and Lynn the flood commonly sets along shore to the westward; between Stukey Overfalls and the north end of the Docking, about W.S.W., and the ebb E.N.E. Here it is high water at 6 o'clock; and spring-tides rise and fall 16 feet, neaps 10 feet.

Between the north end of the Docking and the south end of the Inner Dowsing, the first of the flood sets S.W., changing to W. by S., until it is high water. Outside the Docking and Dowsing, and near the south part of Race's Bank, spring-tides never slacken, but continue their velocity of 2½ and 3 knots; the first-quarter flood sets S.E., the second quarter from S.S.W. to S.W. by W., gradually varying until high water, when it becomes west: while the first-quarter ebb sets from W.N.W. to N.N.W., half-ebb about N.N.E. or N.E. by N., then E.N.E., east, and E.S.E., until low water.

In Lynn Well it is high water at 6h. 30m.; spring-tides commonly rising 23 feet, neaps 14 feet; the former running 4½ and 5 knots, the latter 2½ knots.

Off Boston buoys the flood sets W.S.W., and off the Long Sand Hook W. by S., the ebb being the reverse way.

Near the north end of the Inner Dowsing the flood sets S.W. by W., between that sand and the shore S.S.W., running until ½ after 5h.

At the Spurn point it is high water, on full and change days, at 15m. after 5h. In Hull Road at 6h. In the Humber, spring-tides rise 20 and 23 feet, neaps 10 and 14 feet. Off the mouth of the Humber, at the distance of 7 or 8 miles, it continues to run till 7, and ½ after 7 o'clock.

In Bridlington Bay it is high water at ½ after 4h.; spring-tides rising 15 feet, neaps 9. Here the flood sets strongly along shore to the southward, and continues to run until ½ after 7 o'clock. In the offing it runs for 3 hours after high water on the shore, or until it is half-ebb there.

At Flamborough Head it is high water at ½ after 4h. Spring-tides rise 20 feet, and neaps 11 feet. On the south side, near the head, the flood sets S.W. by W., and the ebb the contrary; for which reason, vessels bound to the southward, should not pass the head without the flood in their favour, especially with a scant wind.

At Scarborough it is high water 15m. after 4h.; and spring-tides rise 18 feet, neaps 8 feet. In the offing the stream runs until 6h. 45m.

FROM FLAMBOROUGH HEAD TO ST. ABB'S HEAD,

Description of the Coast, &c., with Directions.

At FLAMBOROUGH HEAD the land is very high, and continues so to Speeton Cliffs, being bold-to, and without danger. At 8½ miles from Flamborough Head, is Filey Brig, a bold rocky promontory, advancing into the sea, forming a kind of hook. Behind, or to the southward of this hook, small coasters sometimes ride sheltered from N.W., but open to all other winds.

FILEY BRIG BUOY is placed, in 6 fathoms at low water, spring-tides, at the

extremity of the reef off Filey Point, with the first white cliff to the northward of that point, just open to the eastward of the high part of the reef bearing N.W. ½ W.; Collin's white mill, its length open to the northward of a high white house W. ½ N.; and Myers' house, well open to the southward of the roadway S.W. ½ S.

Filey Bay is all clean, shoaling gradually to the beach. To clear Filey Brig, keep Myers' house well open to the south of Hunmanby White Road, bearing S.W. High water, full and change, at 4h. 20m. Springs rise 18 feet, neaps 10 feet.

SCARBOROUGH is a pier harbour, and the vessels, at low water, may lie aground in it. Upon a white tower on Vincent's pier-head, is a tide-light, to be left on the starboard side in entering the harbour The building is 58 feet high, and shows a *red* light to seaward and *bright* towards the harbour. In the day-time a ball is hoisted while there is 12 feet of water at the pier-head, and 10 feet in the harbour. The light is visible, in clear weather, 13 miles.

The best times for going into this harbour are, at half-flood, or after the first-quarter ebb; at these times ships may be run aground; the bottom being clean sand. Should the wind be from the north at the time of your going in, it will be necessary for you to stand over toward the Spa House, but you must be careful to avoid the *rocks* that lie out a considerable distance from the shore, to the southward of the Spa, which dry. The swell, coming round the pier-head, when northerly or easterly winds blow strong, causes the ships in the harbour to range very much when they are afloat. At such times it is necessary to moor them with their cables to the dolphins or piers.

Scarborough has a good outlet for ships bound to the southward, but bad for those going to the northward. You may anchor in Scarborough Wick, but it is not safe to continue there long. The marks for anchoring are, the castle N.N.W.; the church west open to the southward of the castle; the Spa House west; and Flamborough Head just open of Filey Brig: you will then have about 6 fathoms.

From Scarborough the land to the northward is *rocky*, and stretches N. by E. for about 5 miles, to a place called Haiburn Wick: it then winds north, 3 miles, towards the south cheek of Robin Hood's Bay.

ROBIN HOOD'S BAY is a place where vessels may stop a tide, riding under the north cheek of the bay, in 8 or 9 fathoms; but it will not be prudent to remain there long, especially in winter. The south and north cheeks of the bay are *clusters of rocks*, which project into the sea, and consequently must always have a good berth given to them in passing.

WHITBY HARBOUR lies about 7 miles N. by W. ½ W. from the south cheek of Robin Hood's Bay. It is a pier harbour, and ebbs almost dry. In your passage to Whitby, there is a *very dangerous ledge of rocks*, lying to the eastward of the harbour, full ¾ of a mile from shore, and having a passage within it 300 yards broad, called the *Sledway*; this *ledge* is called the *Whitby Rock*, and rendered particularly hazardous on account of the flood setting to the southward directly across the harbour's mouth; it is composed of *hard black rocks*, with large stones lying down to the low water mark; its head bearing from the western pier N.E. ¾ N., distant ¾ of a mile. A black beacon-buoy is placed about a cable's length N.E. of the extremity of Whitby Rock, in 10 fathoms, with the white gable end of the Marine Hotel in line with the north side of the west pier-head.

Whitby Road lies between Whitby and Upgang Rocks, which latter bears N.W. ½ W., a mile distant from the former, stretching out from the shore, until its eastern end bears N.N.W. from the western pier, distant 1¼ mile. Over Upgang Rock are only 4 and 5 feet water; but in the roadstead are 5, 6, and 7 fathoms. The mark for the anchorage being Larphill House over the middle of Whitby Town, bearing S.S.W.

The town of Whitby is situated at the entrance of the River Esk. The harbour is considered the best hereabout. On the western pier is a lighthouse in latitude 54° 29′ 42″ north, and longitude 0° 36′ 42″ west, 83 feet above the level of the sea, which exhibits a fixed light two hours before and after high water; a flag in the day-time is also shown there during the same period of the tide. In clear weather, this light may be seen about 13 miles.

If coming from the southward, you must take care to avoid the *Whitby Rock*, by keeping the north cheek of Robin Hood's Bay open of High Whitby, until you bring a remarkable house in the country, called Larphill House, on with the east pier end, bearing S.S.W. ¾ W., and with that mark, enter the harbour. Should the boats not

venture off to your assistance, if you see a flag hoisted on the north cliff, you may safely run for the harbour; but if, instead of the flag, you observe a fire in that place, you are to understand, that your attempting to go in would be attended with imminent danger.

You are also particularly to observe, that at spring-tides, when the wind blows hard from between S.S.E. and east, vessels drawing 10 feet may go through the Sledway, if the signal be hoisted to pass the bar; but all vessels drawing more than 10 feet water must haul round the north part of Whitby Rock. The mark for sailing through the Sledway is, the second Nab, on the west side of the harbour, open to the northward of the west pier-head. In losing the flood-tide, so soon as you get within the rock, haul up, until the second pier-head on the eastern side appears a sail's breadth open of the east pier-head, then stand in for the harbour. Instances have occurred, when vessels have been unable to fetch in, on account of giving the rock too wide a berth, this having occasioned their hauling up so much as to get the sea on or before the beam, which, by checking their headway, obliged them to fall to leeward, and to go on shore. At high water the sea appears all broken between the rock and the main; and whenever this occurs with easterly winds, there will be but little tide to the southward.

Sand's End is a bay, or roadstead, where vessels with southerly winds may ride safely, in from 8 to 4 fathoms water. It lies N.W. by W., abcut 2 miles from Whitby Rock; having Upgang Rock half-way between them. A mark for Sand's End Road to the westward is, the middle of Sand's End town and Mulgrave Castle, in one, bearing W. by S. $\frac{1}{4}$ S.

RUNSWICK BAY.—About 5 miles N.W. by N. from Whitby, is Runswick Bay, capable of containing about 18 sail of shipping, in 5 and 6 fathoms water; it is clear of rocks, and forms a good retreat for vessels in gales of wind, but too open to the northward; the mark for running in is, Brown's Hill, kept on with the limekiln on the west side, until the cliff, on which it stands, shuts in the high land behind; you will then be in $4\frac{1}{2}$ fathoms, clayey ground.

When you are to the northward of Runswick Bay, and between it and the Tees, bring the ruins of Whitby Abbey open of Kettleness, and this will clear the land all the way.

About 4 leagues N.W. from Whitby is Hunt Cliff. The coast between is irregular and rocky; your courses, therefore, from Whitby, will be N.N.W., 7 miles, and then about N.W. by W., 6 miles. From Hunt Cliff, Hartlepool bears N.N.W. $\frac{1}{2}$ W., distant nearly $3\frac{1}{2}$ leagues: and to Souter Point N. $\frac{3}{4}$ W., 9 leagues. Between Hunt Cliff and Hartlepool lies the entrance to the River Tees. In your passage from Hunt Cliff lie the *Salt Scars*, which are *extremely dangerous;* and to the southward of these, are some *rocky spots*, of only 2 fathoms water; of these the outer one is called the *High Rock*, lying nearly in a line between the outer part of the Salt Scars and Hunt Cliff, or 3 miles N.W. by N. $\frac{1}{2}$ N. from the latter.

The SALT SCARS are *two* or *three narrow ridges of rocks*, extending from abreast of Redcar Point, to the eastward, above $1\frac{1}{4}$ mile; they dry at half-ebb, a mile N.E. from Redcar. These rocks should never be approached nearer than 10 or 9 fathoms. Some vessels have been wrecked upon them in consequence of mistaking the west end of Barnaby Moor for Hunt Cliff Foot, and by not getting a cast of the lead in time. To prevent such mistakes in future, observe that Hunt Cliff Foot is almost perpendicular, while Barnaby Moor slopes to the westward, and upon it stands Captain Cook's tower. At night the low land cannot be seen, and this occasions the error; the mariner will do well, therefore, to attend to his soundings. You may anchor before the mouth of the Tees, in 8, 9, or 10 fathoms, fine brown sand, the ground clean, and holding tolerably well.

Buoy on the Salt Scars.—A black buoy is placed, to mark the extremity of the eastern projection of the Salt Scar Rocks. The said buoy lies in $6\frac{1}{2}$ fathoms at low water, spring-tides, with Seaton high lighthouse N.W.; Redcar mill S.W. by W.; Marsk Church S. $\frac{1}{4}$ W.; and Hartlepool Pier lighthouse N.N.W. $\frac{3}{4}$ W.

RIVER TEES.—The channel into this river is between the North and South Gare, within which it is bounded on the N.W. by the Seal Sand and on the S.E. by the Bran Sand, Stony Brig, &c. Its channel is marked by several beacons and buoys; but they are liable to be occasionally altered, in conformity to the shifting of the sands.

Tees Fairway Buoy is a large improved buoy, which is 20 feet high from the surface of the water to the top of the skeleton ball, and may be seen at the distance

of 8 miles, and will indicate much more perfectly the entrance to the river in stormy weather.

The fairway buoy lies in 4 fathoms, on the outside of the bar, about ½ a mile distant from the red bar buoy which lies on the edge of the bar, and marks the deepest water, being about 8 feet with a low ebb.

BRAN SAND LIGHTHOUSES.—Two lighthouses are erected on the west part of the Bran Sand for the purpose of exhibiting fixed lights. These lights, together with the two Seaton lighthouses form the cross-bearing for pointing out the position of the fairway buoy, but for the present (June, 1854) on account of the shifting of the bar are not lighted, Other small lights are established for the navigation of the estuary of the River Tees, but which are only serviceable to those acquainted with the navigation of the river.

If you are bound into the River Tees from the southward, steer from Hunt Cliff N.N.W. ½ W. with the flood, and N.W. by N. with an ebb tide; this will clear you of the Salt Scars, towards which approach no nearer than 9 fathoms. The leading-mark is, Elwick beacon (a small round hill on the southernmost extremity of the high land in Durham), in one with a high house in the north part of Seaton, bearing N.W. ¼ W.; and when the west end of Barnaby Moor bears S.W., you will have passed that reef. With a southerly wind you may anchor in Tees Bay in 6 or 7 fathoms, with the west end of Barnaby Moor S.W. by S., or S.S.W. ½ W.

If bound into the Tees from the northward, and being abreast of Hartlepool, with the wind at N.W., or more northerly, steer in so as to bring the Duke of Cleveland's house (which is white, with a flat blue-slated roof, and stands near to the westward of the Church of Hartlepool), just touching the steeple end of the church, bearing about N. ¼ W., and it will carry you to the bar of the Tees.

To clear the Long Scars, which has a black buoy on its extremity, bearing south from Hartlepool lighthouse, bring a high sand-hill, situated to the northward of Hartlepool, over the chapel at the west end of the town; the thwart mark is, Carr blue-tiled house W. by S. ¼ S. Keeping the chimnies open either way will clear it; come no nearer than 5 or 6 fathoms.

SEATON LIGHTHOUSES.—Two towers have been erected a short distance northward of Seaton Carew, being situate from each other north 52° 15′ west, and south 52° 15′ east, distant 3,550 feet; from the high, or north-western of which, a bright fixed light; and from the low, or south-eastern, a stationary red light will be displayed; the former burning at an elevation of 85 feet, and the latter at 30 feet above the level of the sea at high water, spring-tides.

LONG SCAR ROCK BUOY lies 20 fathoms east of a *small rock* (with only 13 feet on it at low water), in 20 feet at low water, with Hartlepool lighthouse bearing north; Hartlepool old pier lighthouse N. by W. ¾ W.; Seaton high lighthouse west; and Tees fairway spiral buoy S. ¼ E.

HARTLEPOOL is situated on a promontory nearly surrounded by the sea. The harbour is small, but recently has been greatly improved by a pier, flood-gates, &c., so that small vessels may now run in there, and be securely sheltered.

HARTLEPOOL HEUGH NEW LIGHTHOUSE is situated in latitude 54° 41′ 51″ north, and longitude 1° 10′ 19″ west, from which a fixed white light is exhibited all night at 85 feet above the sea, and visible 16 miles.

There is also seen from the same tower at night (underneath the principal lights), from half-flood to half-ebb, a tidal light, of a red colour, which is visible to the eye within the limits of 4 miles, but beyond that distance it blends with the main light, rendering it indistinct. During the day, at half-flood, a red ball is hoisted to the top of the mast on the tower, where it remains until half-ebb.

On the pier-head is a lighthouse, from which is exhibited a red light; and ships coming from the northward will open this light when it bears W.N.W., and should not in the night-time, approach nearer the shore than 6 or 7 fathoms water at high tide; and when the light bears N.N.W., they may anchor, if necessary.

Two red lights have also been placed upon the dock walls, as a further direction; and in running for the harbour, when the pier-light bears N.N.E. ½ E., about 120 fathoms, vessels must steer in a N. ½ E. direction, until the two lights are brought in a line, bearing N. by W.; which is a direct course up the channel to the entrance of the inner harbour.

WEST HARBOUR DOCK LIGHTS are green, and one shown on each pier.

A large buoy is situated off the southern extremity of the Heugh, known as the

"Buoy of the Stone," moored in 22 feet low water of spring-tides, and which has an iron wicker-ball and staff. The Heugh light bearing therefrom, N. $\frac{1}{3}$ E., distant $\frac{1}{3}$ of a mile; the red light on the pier-head of the old harbour N.W. $\frac{3}{4}$ W., $\frac{4}{10}$ of a mile; and the green light on the north pier-head of the West Harbour W. by N. $\frac{1}{4}$ N., $\frac{8}{10}$ of a mile.

SEAHAM.—This place is now rising into consequence; and a new harbour, with two piers, is formed there, with the intention of being able to afford further accommodation for vessels using the port, and to extend the exportation of coals therefrom. It is situated between 9 and 10 miles to the northward of Hartlepool, and 5 miles S. by W. $\frac{1}{2}$ W. from the entrance to Sunderland.

About $\frac{1}{2}$ a mile S.S.E. from Seaham Harbour is a *shoal* of 9 feet; and within it, in the same direction, are *two knolls*, or *scars*, on which buoys are placed. There is also a shoal of 11 feet lying $\frac{1}{4}$ of a mile eastward of the harbour.

SEAHAM LIGHTHOUSE.—This lighthouse is lighted with brilliant gas, the top lantern showing a constant bright light, 94 feet above the mean level of the sea. The lower lantern is a red revolving light, $\frac{1}{2}$ a minute visible, and $\frac{1}{2}$ a minute invisible, at all points where the top light is seen. It is 49 feet above the level of the sea. This light will be easily distinguished from all other lights on this part of the coast. On the south pier is a fixed tide light, to intimate to vessels outside that they may run for the harbour.

SUNDERLAND is now considerably improved, having two excellent piers, upon each of which is a lighthouse. The northern is 64 feet high, and the southern 23 feet, the lanterns being 73 and 32 feet above the level of high water. Both are fixed lights, and may be seen 13 and 10 miles off. The northern one is lighted during the whole night; the southern one from half-flood to a quarter-ebb only, or while the wind and tide are favourable for entering the harbour. With a westerly wind, it is put out at high water. In the day-time a flag is hoisted during the same period of tide.

The lighthouse on the northern pier has been removed 150 yards to the eastern extremity of the same; it now exhibits, in addition to the bright light of 73 feet in height, a red-coloured light, 18 feet below the former, both of which are kept burning from sunset to sunrise.

There is a *patch*, called the *White Stones*, having only $1\frac{3}{4}$ fathom on it, lying $\frac{5}{8}$ of a mile S. by W. from the Hendon Rocks, having 5 and 6 fathoms within it, forming the Hendon Channel.

HENDON ROCK.—This rock has a black buoy, lying $1\frac{1}{3}$ mile S.S.E. from the north pier lighthouse.

Two beacons are erected on the outer part of the rocks, which lie to the northward and southward of the piers.

The Outer Scar, of only 7 feet, lies on the western side of the Hendon Channel, a mile S. by W. of the south beacon. Rock Lodge kept open of the east of the south pier lighthouse, bearing north, clears the Outer Scar to the eastward. In the day-time, a flag is hoisted on the south pier half mast high, when there is a depth of 8 feet on the bar. When there is a depth of 10 feet, with a smooth sea, it is hoisted to the mast head, and continued with a westerly wind; and the wind from S.S.E. to N.N.E., it is kept up $1\frac{1}{2}$ hour after high water.

In the night, blue lights are exhibited every $\frac{1}{4}$ of an hour, when the weather is stormy and the harbour dangerous to enter. In foggy weather, a bell is rung for the guidance of vessels, at intervals of $\frac{1}{4}$ of an hour.

In approaching this port from the northward, the north pier light should not be brought to the southward of W.S.W., to avoid the Knocks, which lie eastward of the north beacon; and when from the southward, not to be brought to the northward of N.W. $\frac{1}{2}$ N., until the harbour is open. St. Peter's Church, open south of the north pier, leads into the harbour.

TYNEMOUTH.—About 3 miles N.E. by N. from Sunderland, is Souter Point; and $3\frac{1}{2}$ miles N. by W. from Souter Point is Tynemouth Haven; this place is easily known in the day-time by a castle, in ruins, which stands on the northern side; and in the night-time by a revolving light, exhibiting a light in its brightest state once every minute, like a star of the first magnitude; but gradually declining, and becoming less luminous, until it is quite eclipsed. The lighthouse is built of stone, in the castle yard, 75 feet high, and its lantern elevated 154 feet above the level of the sea, and may be seen 6 leagues off.

The Collingwood monument, now erected at the entrance of the Tyne, a little west of the Spanish battery, forms a conspicuous land-mark for seamen, and easily distinguished from all others. The height, with the statue, is about 100 feet.

In proceeding along shore from Sunderland to Tynemouth, you should give the land a good berth, for it is generally rocky. On that side, just without, and opposite to the little islet, called Prior's Haven, is the *Sparrow Hawk*, a *most dangerous rock;* and at the south side of the entrance to the haven is a *large sand*, called the *Herd.*

A black buoy is now laid down at the entrance of Shields Harbour, close to the N.E. point of the Herd Sand, in 7½ feet at low water, spring-sides, with Tynemouth lighthouse N. ¾ W.; the high light at North Shields W. by N. ¾ N.; and the above high lighthouse 2 sails' breadth open of the low lighthouse.

Within the river, and near the town of North Shields, are two lighthouses, which lead over the bar, and close to the Herd Sand, in the deepest water; and when coming from the northward, there are two beacons erected on the "*Law*," which, brought in one, with a northerly wind, will carry you close to windward, until the lights come on with each other.

These lighthouses are white, the highest being in front of Dockwray Square, and the lower near Clifford's Fort, bearing from each other W. ½ N. and E. ½ S., distant 720 feet. They exhibit bright fixed lights, of 123 and 77 feet respectively above the level of high water, and may be seen 16 and 13 miles off. The upper tower is 49, and the lower 76 feet high. The lights appear only from the first-quarter flood to the first-quarter ebb; and a blue flag is hoisted, in the day-time, during the same period of tide. On the bar, at lowest ebbs, are 7 to 8 feet water.

There are three warping-buoys within the river; two on the south, and one on the north side; and a buoy outside of Clifford's Fort, where the low light is situated. A post is placed at the south side, near the town of South Shields, bearing a flag at tide-time, to denote when vessels may go over the bar. Within the bar, you will have from 10 to 17 feet, the greatest depth being near the northern side as you enter, until you reach the first warping-buoy on the north side; then haul over S.W. to the second buoy, keeping mid-channel, and your depth will again increase from 12 to 23 feet towards the town of Shields.

No vessels are here permitted to wait above a tide, if the weather will permit them to put to sea; and strong northerly winds will always increase the depth of water over the bar, while strong southerly gales will decrease it. There is anchorage off Tynemouth Castle, the light bearing W. by N., in 7, 8, and 9 fathoms. In settled weather, it is high water, full and change, about 3 o'clock upon the bar. Northerly winds may make it so an hour sooner, and southerly winds an hour later. Spring-tides rise about 14 feet, neaps 8½.

BLYTH.—About 11 miles N. by E. from Tynemouth Castle, is Newbiggen Point. Between them lie Hartley and Blyth, two small harbours, where ships load coals and salt; and these harbours, at low water, are dry. Off Blyth are some *rocks*, called the *Sow and Pigs*, which appear at the last quarter-ebb; by keeping Tynemouth Castle open of, or without Hartley Bates, you will go clear of them. The *Bates* is a *rocky point*, or *ridge*, which extends a considerable way from the shore to the southward of Hartley Harbour. There are also *three other rocks*, lying near the land, to the northward of the Bates, called the *Outer Bell Rock*, *Inner Bell Rock*, and *Colville Rock*. This part is usually called Seaton Road.

At Blyth Harbour, near the south end of the town, there are two bright fixed lights, placed on the port side of the entrance, which are always exhibited when there are 8 feet water over the bar, and visible at the distance of 11 and 7 miles, according to the state of the weather; in the day-time, a flag is hoisted instead, at the same period of the tide. The two lights in a line bearing N. by W. ½ W. lead in; and the two link beacons in one, bearing N.W. by W. ⅓ W., clears the Seaton Rocks.

Off Newbiggen Point the *rocks* extend nearly ½ a mile from the land; and off Cresswell the *foul ground* runs out full ½ a mile from the shore. The *Cresswell Skeres* are *two rocks*, with only 3 fathoms on them, with 12 to 15 fathoms close-to on the eastern side, and from 7 to 8 just within them. They lie 1¼ mile from the shore. Ratchcugh Crag, over the highest part of Hauxley trees, bearing N. ¼ E., leads directly on them. The thwart mark for the southernmost rock is, Cresswell Hall W. by S., 1¼ mile; and for the northernmost, on the same building, S.W. by W. ¼ W., nearly 2 miles.

N. by E., distant 2½ miles from the North Cresswell Skere, lies the *White Bank*, with 2½ fathoms upon it; and N.E., ¼ of a mile from the latter, lies the *Northern Hill*, with 2¼ fathoms on it, having a passage between them, with 4 fathoms in it. These *two patches* lie a mile from the land. The mark to clear them to the eastward is, Dunstanborough Castle N. by E., open east of Coquet Island. This mark will also carry you clear to the eastward of Bondicar and Hauxley Rocks.

COQUET ISLAND (in latitade 55° 20′ north, and longitude 1° 32′ west,) is a small rocky island, about ⅜ of a mile distant from the main; about 8½ miles N. by E. ½ E. from Newbiggen Point; and nearly 20 miles N. by E. from Tynemouth lights. Within there is good anchorage; but it will be always more safe for vessels to go round the north end of the island to this anchorage, than between the island and the main, being less intricate.

Every navigator frequenting this *most dangerous part* of the coast, in thick weather, should keep the lead constantly going; for the influence of the tides over your vessel is here excessive, and the neglect of the lead has been the destruction of numerous ships and lives.

COQUET ISLAND LIGHTHOUSE exhibits a bright fixed light, of great power. It is visible from N. by E. ½ E. to S. by W. ½ W. A dim light is seen round the remainder of the circle. When seen in the direction of Hauxley Point buoy, it appears red, and to avoid the Boulmer Rocks a red light is shown in that direction. The lantern is 83 feet above high water.

TIDES.—The tides in the south channel, for the first half-flood, set in the direction of the channel; but after that, and until an hour after high water on shore, it sets more southerly towards Hauxley Rocks. The ebb-tide sets fair.

On the first rise of the tide on the shore, it sets S.E., round the North Steel, and for about 1½ hour joins the ebb on the east side of the Coquet. The strength of the tide is about ½ a mile an hour on neaps, and 1½ on springs.

It is high water, full and change, at 2h. 41m.; spring-tides rise 14 to 15 feet, neaps 10 to 11 feet. The stream of tide does not run to the northward until 3 hours after the time of high water by the shore; nor to the southward until 3 hours after low water.

WARKWORTH HARBOUR.—The entrance to this harbour, or river, lies about 1¼ mile N.W. from Coquet Island light. On the north end of the south pier of the harbour, a tidal light is shown when there are 10 feet on the *bar*, at the flood, and remains until the depth of water decreases to less than 10 feet on the ebb. The said light is coloured *red*, and is visible at the distance of a mile. It is about ⅜ of a mile west of the Pan Bush.

A flag is hoisted, in bad weather, on the flagstaff a little to the southward of the entrance of the harbour, when there are 10 feet on the bar, and remains till it decreases to the same depth.

A diamond beacon is erected on the east end of the north pier, for the better guidance of vessels entering the harbour.

ALNMOUTH.—About 4 miles N.N.W. from Coquet Island, is the entrance to the River Aln, leading to Alnwick. From hence to North Sunderland Point, the coast is encumbered with *rocks* and irregularities, extending nearly a mile from the shore. Its general bearing is about N. by E., and the distance about 12 miles; from Tynemouth Castle to Sunderland Point, the direct bearing and distance are nearly N. by E., 11½ leagues; from Coquet Island to Sunderland Point the bearing and distance are N. by E., 15 miles.

BOULMER STEEL.—A chequered black-and-white nun-buoy has been laid down off the Boulmer Steel, in 5 fathoms water, with Coquet Island S. by W. ½ W.; Alnmouth west; Dunstanborough Castle north.

Half-way between Alnmouth and Sunderland Point, upon a projecting neck of cliffy sand, stand the ruins of Dunstanborough Castle, forming a conspicuous mark, and situated close to the sea: these serve to point out this part of the coast, and cannot well be mistaken for any other object.

Cresswell Hall, open south of Hauxley Point, S.S.W. ¼ W., clears Alnmouth Rocks, Boulmer Bush, and Boulmer Steel. Off Newton cliffs* there are *two other rocks*, called the *Faggot* and *Barnyard*, lying ¾ of a mile from the shore; and *one* within them, named *Whitttingham Carr*. Bamborough Castle, open of Beadnel Point, bearing N. by W. ¼ W., clears the Barnyard and the above shoals.

* A large conical nun-buoy bas been laid down on the rocks off Newtown Point.

To the northward of Sunderland Point, lie the Farn and Staple Islands. Farn Island lies from Sunderland Point N. ½ E., distant 2½ miles; and the Staples Island N.E. by N., nearly 4 miles. From Tynemouth Castle to the Staples, the course is N. by E. ¼ E., and the distance about 13 leagues. To the N.N.W. of Sunderland Point, about a league, is the remarkable and extensive remains of Bamborough Castle, where a most humane institution is established for the relief of vessels in distress, and mariners shipwrecked on this coast.

SUNDERLAND POINT, HOLY ISLAND, FARN AND STAPLES ISLANDS, AND DANGERS ADJACENT.

Description of the Land, &c., with Directions.

SUNDERLAND POINT, or the SNOOK, is formed by a low cliff, about 20 feet above the level of high water, with some rocks projecting from it, partly covered at low water, and a *detached rock*, called the *Grimstone*, just visible at low water. Near the point stands the remains of a windmill, in appearance much like a small round tower. About ½ a mile to the northward of the point, are the north Sunderland Sea Houses, close to the beach. Here is a pier and small dock, with 13 feet water, spring-tides, 7 neap, high-tides; but dry at low water. Two small beacons stand at the south side of the entrance, for warping out by.

A nun-buoy (painted red) has been laid down and moored off North Sunderland Point, in 6 fathoms, low water, spring-tides; with the extreme of Sunderland Point S.W. by W. ½ W., distant 60 fathoms; the Grimstone Rock, N.W. by N., distant 200 fathoms; and the light on the Inner Farn N. ¼ E.

BAMBOROUGH CASTLE stands on a rocky foundation, of considerable elevation, with sand hills on each side of it, in latitude 55° 36′ 42″ north, and longitude 1° 42′ 8″ west; the principal tower seems perfect, and is inhabited. At its N.W. side is a mill, and to the north-eastward is a battery; near it is the town of Bamborough, with a church, serving as a mark; and to the N.W. are the Budle Hills, which extend along the south side of Warnham Flats; near the northern extremity of which, is the white signal-house with red tiles.

The country, in the immediate vicinity of the coast between Sunderland Point and Bamborough Castle, is flat; but a few miles inland it rises to a hill, or ridge, of cultivated land, extending parallel to the coast. At a considerable distance to the S.W. of the point, is Heffer Law Hill, distinguished by a plantation on its northern summit, and seemingly with a house on its southern part, the land sloping gradually to the southward; while to the northward, after forming a curve, or hollow, it rises again to a higher and more extensive hill, and then declines to the level of the before-mentioned ridge; on the north part of which, but to the S.W. of Bamborough Castle, is Hebron Hill, which, being higher than the ridge, and uncultivated, may be easily known. The tops of some of the Cheviot Hills,* which are much higher and larger than the Hebron, are visible to the N.W., or inland, from it.

On the northern declivity of the largest is a currach, or pyramid of stones, used as a mark to the shepherds, when the hills are covered with snow. The villages and houses in the neighbourhood of the coast, between Sunderland Point and Bamborough Castle, and which are visible from the sea, taken in a regular order from the southward, are as follow:—

NORTH SUNDERLAND SEA HOUSES are situated nearly ½ a mile to the northward of the point, and close to the beach, where, as before observed, there is

* The highest of the Cheviot Hills is 2,670 feet in height, and is in latitude 55° 29′ north, and longitude 2° 8′ west.

a pier and small dock. The southern building, with red tiles, is the granary, at the south end of which there is a post, placed about 3 yards off. The leading-mark between the rocks, until you come to the pier-head, is to open the space between this post and the end of the granary.

There is another small beacon on the northern side of the creek, and some limekilns to the westward of the pier, where vessels load with that article, and also with corn. On the rocks at the S.E. side of the pier, there is a long building, called the Herring-house, in an east and west direction, which has become an excellent mark along the coast. If a vessel be bound in here, she should keep the Megstone and Farn Island touching, until a pilot comes on board.

Hovel House is a small dwelling standing near to, and on the south side of Sunderland Sea Houses. North Sunderland is a large village situated to the west of Sunderland Sea Houses. Shorestone comprehends a farm and a village standing to the north of the Sea Houses, and between is the remains of a windmill, similar to that upon Sunderland Point. Near the coast is a colliery, with a high steam-engine chimney. New Shorestone is to the west of Shorestone village, and consists of a new house and offices, covered with blue slates. About half-way between the Sea Houses and Bamborough Castle, and close to the beach, is Monkhouse, covered with red tiles. Here is a sort of landing-place between the rocks, where you may obtain fresh water.

Elford is a little village, somewhat elevated, with trees about it, and situated at a considerable distance from Monkhouse. Greenhill is to the northward of Monkhouse, and is merely a farm-house with offices adjoining; there is a small house to the westward of it, usually called Fowberry House. Between Green Hill and Bamborough Castle are some barns, covered with red tiling. Glororum stands to the S.W. of Bamborough, and is built upon rising ground; to the eastward of it are some trees, which are very conspicuous; and between Glororum and Bamborough Castle is a small house called Dukesfield. There is also a high steam-engine chimney at Glororum, which is used as a mark.

HOLY ISLAND, or LINDISFARN, lies about $1\frac{1}{2}$ mile from the main land, between which and a small low islet, called the Old Law, there is a channel, or harbour. The eastern shore is foul and rocky. The castle stands on the east side of the harbour, in latitude 55° 40′ 20″ north, and longitude 1° 46′ 38″ west, and is built on a rocky round hill. The town, called Lindisfarn, is on the west side of the island. The ruins of its abbey, the belfry of its church, the beacon on the heugh, or look-out hill, and the square building near it, are all used as marks in the navigation of the coast and harbour. A buoy is placed on the outer end, or S.E. point of the Stone Ridge. It is strongly recommended, that every vessel entering Holy Island Harbour, should take a pilot.

"On approaching the harbour, the beacons on Old Law must be first looked for. The easternmost one is a brick obelisk, crowned by a wooden triangle; it stands on the beach at high water mark, above which its summit rises 77 feet. The western beacon is similar in form and material, but 25 feet higher, and bears from the eastern one W.N.W. $\frac{1}{2}$ W. The beacon on Emanuel Head (the N.E. point of Holy Island) is a sharp-pointed pyramid, built of stone, and placed near to high water mark, from whence *many rocks* and *large stones* extend out nearly $\frac{1}{4}$ of a mile.

"Lindisfarn Castle stands on a picturesque rock; and being 108 feet above high water level, is a very conspicuous mark.

"The heugh is a dark green hill, to the westward of the castle, and terminates towards the harbour in a rocky cliff. Near the centre of the hill is a wooden beacon, forming the second leading-mark to the anchorage off the heugh. Near the western extremity of the heugh, is a small building, without a roof, called the Look-out; to the northward of it, are the magnificent ruins of the cathedral, and to the west of the ruins is the church, the belfry of which is the mark already noticed. The town lies to the northward of the cathedral. Off the western part of the heugh, there is a small rocky projection, which, at high water, is an island, but joins the Heugh Ridge when the tide is low; it is called St. Cuthbert's Island, and by the pilots Hob Thrush."*

* The above description of the principal buildings on Holy Island, and many of the following marks and directions, are from the "Sailing Directions from Sunderland Point to Berwick, including the Farn Islands, by Commander E. J. Johnson, R.N." The same officer has made an excellent survey of this intricate and dangerous part of the coast, which, with the directions, are published at the Hydrographic Office, Admiralty.

It is high water at Holy Island at 2h. 30m., and spring-tides rise 15 feet.

From Bamborough Castle to the south point of Holy Island, the course and distance are N. $\frac{3}{4}$ W., $4\frac{1}{4}$ miles. The island thence runs N.N.E., $1\frac{1}{4}$ mile, to Emanuel Head, which is the north-eastern part of the island, and from whence a *sandy flat* continues all the way to Windmill Hill; from thence to near Berwick the shore is bordered with rocks.

Directly off Sunderland Point runs out a *reef of rocks* full $\frac{1}{2}$ a mile, nearly drying at low water, and so steep, that 9 or 10 fathoms are very near it. A small pier, already mentioned, is on the northern side of the point, and the shore is *rocky*. Sunderland bay is shoal full $\frac{1}{3}$ a mile from the shore, having several *reefs*, which render it dangerous to come into less water than 10 or 9 fathoms.

The GRIMSTONE is a *rocky shoal*, situated about a $\frac{1}{4}$ of a mile to the eastward of Sunderland Point, over which the sea commonly breaks, and requires a wide berth to be given to it in passing. The rocks at the Sea Houses project to the eastward a considerable way, and the coast continues rocky for more than $\frac{1}{2}$ a mile to the northward of the pier.

The OUT CARS are situated more than $\frac{1}{4}$ of a mile to the eastward of low water mark, and between the Sea Houses and Monkhouse Rocks. They dry at low water, and commonly have breakers. Green Hill open north of Monkhouse Hill, clears the Out Cars and Grimstone to the eastward.

The *Horse Shoe Start Rock* is one of those lying a little to the S.E. of the Monkhouse, and stretching out a considerable way from the shore. *Islestone* is another, being a *large rock*, extending to the south-eastward of Bamborough Castle, its extreme point lying E.S.E. $\frac{1}{2}$ S. from it, distant about a mile; the mark for it is, Hallidown Hill on with the look-out on Holy Island. There are 4 fathoms water almost close to this rock, and between it and the Farn Island 10 to 14 fathoms. From Islestone to Budle Point and the Bar of Warnham Creek, the shore is chiefly *rocky*, and the land low; between it and Holy Island is *Warnham Flats*, at the north end of which is Holy Island Bar; within this is the harbour, lying at the south side of the island, between it and the Old Law, and inside the Stone Ridge. There are *several rocks* in the vicinity of Holy Island, which will be noticed hereafter.

The FARN, or FERN ISLANDS.—The largest Farn Island is a *rocky islet*, about 100 paces over, having two lighthouses built upon it; it bears E. by S. from Bamborough Castle, distant 2 miles, and is the highest of the group, steep and cliffy to the south-westward, but sloping downward to the N.E. The high lighthouse is situated about 80 feet from the S.W. cliff, coloured white, and the lantern red; this light revolves, is visible all round the horizon, and shows the full face of the reflector every 30 seconds, the centre of which is elevated 87 feet above the level of high water. The low light stands near the N.W. part of the island, and can only be seen in a northerly direction; it bears from the high light N. by W. $\frac{1}{4}$ W., having its lantern also painted red, and a fixed light, 45 feet above high water. There is a remarkable old square building at the N.E. part of this island, called St. Cuthbert's tower, whereon a light was formerly exhibited. The lights in one, bearing S. by E. $\frac{1}{4}$ E., will lead between the Goldstone and Plough Seat, but directly across the Megstone.

E.S.E. from this island are *two little rocky islands*, called the *Wide Opens*, or *Little Farns*, and to the eastward of these are *two black rocks*, named the *Scare Crows*, or *Start Cars;* these are always above water, and on their southern side steep-to, having 9 and 7 fathoms close to them. These rocks and islands are all clustered together, for though separated at high water by different channels, at low water they are all nearly dry.

The BUSH.—At $\frac{1}{4}$ of a mile to the east-south-eastward of the Scare Crows, is a *reef of rocks*, called the *Bush;* the S.E. end of which is visible at low spring-tides, and in S.E. gales has violent breakers. The marks for this part of the reef are, the windmill, at the north end of Bamborough Castle, on with the S.E. high cliff of the easternmost Wide Open; and the south end of the granary at Sunderland Sea Houses, open to the north of the plantation on Heffer Law Hill; the signal-house on Budle Hill open to the southward of Farn Island, W.N.W., leads to the southward of the Bush, and every other shoal.

To the eastward of the Farn, and north of the Inner Wide Open, is a semi-circular *ridge of rocks*, its northern part stretching toward the Farn, forming a sort of basin, called the *Kettle*, having about 2 fathoms water within it: the rocks are all nearly covered at high water. The entrance to this basin is from the northward, and when

sailing in, keep in the mid-channel with the beacon on Emanuel Head, just touching the east side of the Megstone, and remember to allow for the set of the tide. Northward of this ridge is *Knox's Reef*, which stretches out nearly $\frac{2}{3}$ over towards the Staples; some part of it is almost dry at low water, but it deepens toward its outer point to 2 fathoms. The marks for this point are, Hebron Hill, midway between the Farr Island lighthouses, and the limekilns at Sunderland Sea Houses, in a line with the eastern Scare Crow.

The STAPLES ISLAND is the westernmost of a cluster of small islands, separated by narrow channels, and filling the space of $\frac{1}{2}$ a league. This island is of a triangular form, having the remains of a former lighthouse upon it. On its southern side are some *tall rocks*, like broken pillars, 40 feet high, called the *Pinnacles;* to the north-eastward of the Staples Island is the Brownsman, an irregularly shaped island, having the remains of another lighthouse on its northern end, bearing from the high lighthouse of the Farn E.N.E.; near this you will perceive a square tower, and an old house with red tiling.

To the northward of the Brownsman are the two Wamses, from which a *rock* projects to the west and the north-west about a cable's length; they are divided from the Brownsman, and also from each other, at high water, by narrow channels.

About $\frac{3}{4}$ of a mile E.N.E. from the old lighthouse, lies the *Longstone*, a *large rock*, stretching north and south about $\frac{2}{3}$ of a mile. Between the Wamses and Longstone, are a number of *ragged rocks*, some above and others under water. These are called the *Blue Caps*, and the larger one the *Hawker*.

The LONGSTONE, at high water, is separated into several parts, although at low water it forms but one island. Its eastern part is the highest, and is formed of rugged rocks. A lighthouse is erected upon it. The tower of this lighthouse, painted red, stands about 200 yards W.S.W. from the water's edge, and the light is elevated 75 feet above the level of high water mark, at spring-tides. This light, like that in the principal tower upon Farn Island, revolves, showing the full face of the reflector every 30 seconds. It bears E.N.E. from Farn high lighthouse. There is a *shoal* extending from the N.E. point of the Longstone, a short distance in that direction.

The KNAVESTONE is the easternmost *rock* that dries, lying E. by S., $\frac{1}{3}$ of a mile from the north end of the Longstone. The high light on Farn Island in one with the Longstone light, bearing W.S.W., leads over it. It is above water from half-ebb to half-flood, but there is a ripple over it at all times, which will point out its situation; appears black and flat. A *shoal reef* extends from the northern part of the rock about a cable's length, and it is also shoal at its southern part. There is a *rocky shoal* to the north-eastward of the Knavestone, called the *Whirl Rocks*, over which is continually a rippling or race. One of these has only 2 feet over it, while the others have 2 to 4 fathoms over them. The longstone light bears S. W. by W. $\frac{1}{2}$ W. from them. But as the tides, near these rocks and Knavestone, are extremely rapid, and whirl in various directions, vessels are recommended never to approach them within 2 miles.

The GUN REEF consists of *two patches of rocks* running out from the S.W. point of the Staples, and curving round towards the northern end of the Brownsman. The sea-weed along this reef may be seen at low ebbs, and *two small rock-heads* show themselves at about 2 hours' ebb. The mark for the western part of the Gun Reef is, the plantation on Heffer Law Hill open to the N.W. of the Sunderland Sea Houses.

The CRUMSTONE is a *flat rock* above water, lying nearly a mile S.E. by E. from the southern part of the Staples Island, and a mile south from Longstone lighthouse. A *reef*, called the *Callers*, extends nearly $\frac{1}{2}$ a mile from the Crumstone to the N.W., its extreme bearing from the Longstone light S. by W. $\frac{1}{4}$ W., with the northern edge of the Megstone touching the southern edge of Staples Island, and Glororum engine-chimney in a line with Farn high light. About a cable's length S.W. by W. $\frac{1}{2}$ W. from the Crumstone, is a *small rock* called the *Fang*, with 9 feet over it at low water. The Crumstone is the southernmost of the Staples rocks; it bears from the Knavestone S. by W. $\frac{3}{4}$ W., $1\frac{3}{4}$ mile, and from Sunderland Point N.E. $\frac{1}{4}$ E., $3\frac{1}{4}$ miles.

To the northward of Farn Islands lie the *Megstone, Swadman, Elbow, Ox Scar*, and *Glorroum Shad Rocks*.

The MEGSTONE is a *little black rock*, always above water, bearing about N. by W., distant rather more than a mile from Farn Island high lighthouse. The ground between these is rocky, with from 4 to 9 fathoms water.

The SWADMAN is a *rocky reef*, running about W. by N., distant $\frac{1}{2}$ a mile from the Megstone; its western extremity dries at spring-ebbs, and has a black buoy placed near to it, which bears N.N.W. $\frac{3}{4}$ W., distant $1\frac{1}{4}$ mile from the Farn high lighthouse, and W. $\frac{1}{4}$ N. from the Longstone lighthouse. There are 7 fathoms close to it, 9 fathoms a little way off, and 10 fathoms mid-channel between it and the shore. The marks for the western end of the Swadman are, Bamborough Church in one with the highest sand hill near it, which lies to the northward of the castle, and the base of the eastern beacon, on Old Law, seen clear of the adjacent sand hills; but the western end of the reef may be avoided, by keeping the beacon on the heugh, at Holy Island, in one with the church belfry; in which position the base of the east beacon on the Old Law will be shut in with the low point of the sand hills.

The OX SCAR is a *small rock*, appearing above water a little after half-ebb, lying $\frac{1}{2}$ a mile E.N.E. from the Megstone; N. $\frac{3}{4}$ E. from the Farn high lighthouse; and W. $\frac{3}{4}$ N. from the Longstone lighthouse. Its marks are, the Megstone and the highest tower of Bamborough Castle in one, and Farn high lighthouse midway between St. Cuthbert's tower and the low lighthouse. There is a *rocky shoal* running from it to the westward, which at low tides becomes visible; on the extreme or western part of it are 2 fathoms.

Between Farn Island and the Ox Scar is also a *small shoal*, called the *Elbow*, with only 2 feet water over it. This is much in the way of shipping passing between the Ox Scar and Megstone, and in N.E. gales generally breaks. The marks for it are, the low houses at Shorestone open to the southward of the south part of Heffer Law Hill; and Farn high light, between St. Cuthbert's tower and the low light, but rather nearer to the latter. In a line between the old lighthouse on the Brownsman and Bamborough Castle, and to the northward of Knox's reef, is *Islestone Shad*, a *rocky patch*, of $1\frac{1}{2}$ fathom, which breaks with north-easterly gales. It bears from Farn high lighthouse N.E. $\frac{1}{2}$ E., nearly a mile distant, and from Longstone lighthouse W.S.W. $\frac{3}{4}$ W. The marks for it are, Dunstanborough Castle open to the eastward of East Wide Open, and Islestone Rocks, near the coast, on with Hebron Hill.

Between Ox Scar and the Wamses, is a *rocky shoal*, of 2 fathoms, breaking during gales from the N.E. bearing W. $\frac{1}{2}$ N. from Longstone lighthouse, and N.N.E. $\frac{1}{2}$ E. from Farn high lighthouse, distant more than a mile. The marks are, Dunstanborough Castle, touching the western part of Wide Open; the signal-house on Budle Hill, open to the north of the Megstone; or Glororum village on with Hebron Hill; this is called the Glororum Shad.

In an E.S.E. direction from Holy Island Castle, is a *rocky flat*, with *several dangerous rocks* upon it; these are the *Plough*, *Plough Seat*, *Wingate*, *Minscore*, *St. Nicholas*, *Goldstone*, *Stiel*, and *Gussard*.

The PLOUGH appears at half-ebb, is small, and lies E.S.E. $\frac{1}{2}$ E. from Lindisfarn, or Holy Island Castle, distant about $\frac{1}{2}$ a mile; it uncovers at half-ebb, showing about 7 feet in height at low water. The part of the rock that dries is 40 yards long, and on its extremity there is a black wooden beacon, the top reaching only 2 feet above high water. Close to the westward of this rock, there are $3\frac{1}{2}$ fathoms water, deepening to $4\frac{1}{2}$ fathoms in the mid-channel, but shoaling pretty regularly towards the castle point.

The PLOUGH SEAT extends about $\frac{1}{3}$ of a mile E.S.E. $\frac{3}{4}$ E. from the Plough, and partly dries at spring-ebbs; its eastern point has had, since October 20th, 1850, placed upon it a nun, or conical-topped buoy; (the former flat-topped buoy was sometimes driven to the south-westward in severe gales). The look-out on Holy Island touching the north side of the castle, will lead directly over the plough and Seat.

The WINGATE is a *small rock*, lying E.N.E. $\frac{3}{4}$ E., nearly $\frac{1}{3}$ of a mile from the Plough beacon, having not more than 6 feet over it at low water. The marks for it are, St. Cuthbert's tower open to the west of the Megstone, at low water, and the ruins of Holy Island Cathedral in a line with the north end of Wingate Gap.

MINSCORE ROCK lies about $\frac{1}{3}$ of a mile N.E. $\frac{3}{4}$ E. from the Plough beacon; and has 9 feet over it at low water. The marks for it being Black Law, just clear of the high-water mark at the castle point, and the ruins of the cathedral in a line with Wingate Gap.

The GOLDSTONE is a *dangerous rock*, rather more than a mile S.E. by E. $\frac{3}{4}$ E. from the Plough Seat; it is very small, and visible at the last-quarter ebb, having a black buoy near its western side. From it runs a *narrow reef*, extending $\frac{1}{2}$ a mile S.E. by E. $\frac{1}{2}$ E., this is called the *Stiel*, and dries at low spring-ebbs. The mark for

the Goldstone is, the look-out on the heugh, touching the south side of Holy Island Castle. The mark for the western part of the Goldstone, is the Megstone eastern edge, touching the western side of Farn Island. The marks for the eastern part of the Stiel are, the north side of the heugh, touching the south side of Lindisfarn Castle, and the Megstone well open to the east of Sunderland Point.

ST. NICHOLAS ROCK is small, and lies about $\frac{1}{3}$ of a mile N.W. from the Goldstone, having 15 and 16 feet water over it. The marks for this rock are, the east side of the Megstone, just open to the west of Farn Island, and Kyloe Church just open to the north side of Holy Island Castle.

The GUSSARD is *another small shoal*, about the size of a ship, lying $\frac{1}{2}$ a mile S. $\frac{1}{2}$ E. from the Goldstone, and having 2 fathoms over it at low water. Its marks are, the east side of the Megstone, touching the west side of Farn Island, and the beacons on Old Law in a line with the south part of Wingate Gap.

The N.E. side of Holy Island is encumbered with *rocks*, rendering it dangerous to sail near it. The Snipe Point lies N.W., full $\frac{3}{4}$ of a mile from Emanuel Head, having a *reef of rocks* stretching N.E., $\frac{1}{2}$ a mile from it. Keeping Bamborough Castle well outside of Emanuel Head, clears it. At $\frac{1}{2}$ a mile from Emanuel Head, are 7 to 9 fathoms; but at the distance of $1\frac{1}{2}$ mile, 13 to 16 fathoms. From Snipe Point, Holy Island stretches W.N.W., about 2 miles, to Snook End, forming a long sandy point with small hillocks, A *sandy flat* extends itself all the way from Snipe Point to Berwick, being generally called *Holy Island Flats*, or the *Sand Ridge*.

Outside, and at a distance from the land, lie several *dangerous rocky shoals;* these are called the *Park Dike, Wingate, Bean Stack, Tours, Spittal Hirst*, &c. A vessel may safely pass outside of all these, by keeping the signal house, on Budle Hill, in a line with the beacon on Emanuel Head.

The PARK DIKE is the southernmost, and lies N. $\frac{1}{4}$ W., 2 miles from Emanuel Head, having only 10 feet over it, but 5 fathoms close to. The marks for the east end are, Bamborough Castle half-way between the beacon and low water mark on Emanuel Head; Lindisfarn Castle just open to the eastward of False Emanuel Head, and Berrington New Hall just clear to the south of Goswick New Hall. It extends W. by N., $\frac{1}{2}$ a mile, and is about a cable's length wide.

The WINGATE REEF lies to the westward of the Park Dike, and has only 9 feet over its shoalest part. The eastern extremity bears N. by W. $\frac{3}{4}$ W., $2\frac{1}{4}$ miles from Emanuel Head; and the marks for it are, Berrington New Hall clear to the north of Goswick New Hall; and Farn Island high light open to to the eastward of the beacon on Emanuel Head. This reef extends W.S.W. $\frac{1}{2}$ W., nearly a mile; but no vessel should venture to the westward of it at any time.

The BEAN STACK lies close to the northward of Wingate Reef, and nearly on a parallel line, with only 9 feet feet water over it. The eastern end bears N.N.W. $\frac{1}{4}$ W., $2\frac{3}{4}$ miles from Emanuel Head, with Lindisfarn Castle in a line with the centre of the banks near Snipe Point. About $\frac{1}{4}$ of a mile to the northward of the Bean Stack, is the east end of the *North Bean Stack—a large track of foul ground*, extending above $\frac{1}{2}$ a mile W. by N., with 5 fathoms in some parts. There is *another patch of foul ground*, a little farther to the northward, usually called the *Northern Tours*, having 6 fathoms over the shoalest part at the eastern end; and again to the northward of this, is *another rocky patch*, called the *Inner Hirst*, over which are 6 fathoms at low water.

The TOURS REEF lies directly north from Emanuel Head, distant $2\frac{1}{2}$ miles, outside of, and parallel to, the Park Dike; on it are 12 feet, and $4\frac{1}{2}$ fathoms close to its edge. The mark for the eastern part of the Tours and Park Dike is Emanuel Head just open to the westward of Bamborough Castle. Between the Park Dike and Tours are from 7 to 9 fathoms; and a similar depth between them and Snipe Reef. Off their eastern sides are 12 and 13 fathoms, but deepening quickly as you approach towards the offing.

The SPITTAL HIRST is a *rocky shoal*, of about 2 cables in extent, lying S.E. by E. $\frac{1}{2}$ E., $4\frac{1}{2}$ miles from Berwick lighthouse; and north, a little westerly, 5 miles from Emanuel Head. With heavy gales of wind, and spring-ebbs, the breaking of the sea is seen on this reef, both from Berwick and Holy Island; but there does not appear to be less than 5 fathoms upon it at low water, with 9 or 10 fathoms all round. The marks for it are, the easternmost part of Bamborough Castle in a line with the beacon on Emanuel Head; and a remarkable round clump of bushes, at a considerable distance inland, in a line with Cheswick.

The Trinity House Directions for Ships Sailing by the Improved Lights, at the Farn and Staples Islands, corrected to correspond with the New Light on the Longstone.

GENERAL INSTRUCTIONS FOR THE USE OF THE LEAD.—In giving directions for passing these dangerous islands and shoals, upon which there have been so many losses of lives and property, it is to be observed, that they have been principally occasioned by neglecting the necessary attention to the lead. The Corporation, therefore, earnestly recommend to all masters and pilots, when they approach these lights, bound either to the northward or to the southward, to keep the deep-sea lead going upon all that part of the coast, within the distance of Coquet Island and St. Abb's Head; and if they find themselves in less than 30 fathoms, to haul out into that depth of water, which is the least that can be depended upon, to carry a vessel far enough to the eastward to be clear of all dangers, and will bring them in sight of the lights; and when they are in one, bearing W.S.W., which leads over the Knavestone (the easternmost rock), you may proceed, either northward or southward, safe from the dangers of those shoals and islands.

But all masters (and especially strangers to this navigation) are particularly cautioned not to attempt sailing amidst or within these islands or shoals, more particularly on account of the various settings of the rapid tide running in the different sounds between the islands, where probably very little space can be found that is free from rocks, and fit for anchorage. The only two roadsteads recommended are, the one under the Farn, the high light bearing N.N.W., distant about 3 cables' length, in 8 or 10 fathoms: the other in Scate Road, off Warnham Flats, the Farn light bearing S.E., and the light on the Longstone E. by S., in about 7 or 8 fathoms.

If, in making these lights, bound to the northward or southward, and with the wind from the eastward, you cannot pass them in 30 fathoms, or upwards, it is recommended to make a board, if you find it practicable to work to windward, rather than pass through the Inner Sound; but in case of hard gales, and you are in danger of being forced upon the shore, by tacking, to keep the sea, and you cannot pass outside of the islands in 30 fathoms by night, or cannot in the daytime go to the eastward of the breach on the Knavestone (which is only dry at half-ebb), the only resort in such cases will be to take the Sound.

FOR SAILING THROUGH THE SOUND TO THE NORTHWARD.—Under the foregoing circumstances, if bound to the northward, steer for the Farn high light, taking care to avoid the Crumstone Rock (the southernmost of the Staples Islands), from which the lighthouse on the Longstone bears north, a little easterly, distant nearly $1\frac{1}{4}$ mile; and the light on the Farn about W. $\frac{1}{2}$ N., distant 2 miles. To sail clear of which, bring the Farn light no farther to the westward than W.N.W.; and steer in to the westward, until you have the Farn high light bearing N.W. (to avoid Scare Crows and Wide Opens), when you may steer for the light, and pass the S.W. point of the Farn Island at $\frac{1}{2}$ a cable's length, or less, it being steep-to.

When the gale is such as will allow you to steer to the northward, if you can make good a N.N.E. course, you may haul up, in order to pass through the Sound, between the Megstone and Ox Scar (or South Goldstone), and bring the high light as much to the eastward of the low light as their difference of height (that is, the low as much to the westward of the high light as it is lower than the high light), which will take you about 170 yards to the eastward of the middle part, or about 100 yards to the eastward of the dry part of the Megstone Rock, in 6 fathoms. This rock is always 12 feet above water, and steep-to on the east and north sides; so that at 4 or 5 fathoms' distance from the dry rock, on the N.E. side, there are 4 fathoms water, increasing to 6, and shoaling from 6 to 3 fathoms towards the reef, which extends about $\frac{1}{3}$ across the Sound from the Ox Scar towards the Megstone, and leaves the Sound only about 500 yards wide between those two rocks.

In this passage, between the Farn and the Megstone, there are about 8 or 9 fathoms; and in the Sound, between the Megstone and the Ox Scar, about 6 fathoms, with the lights open, as above described. After passing the Megstone (either in sight) or upon deepening again 1 or 2 fathoms, you may bring the lights in one, and proceed in this line. The soundings will vary from 9 to 7 fathoms; and nearly abreast of the Gussard's Seat to 6, or $5\frac{1}{2}$, deepening to 11. When you are abreast of the Goldstone, and

in 12 fathoms, at low water, you are past all danger, and may then proceed, hauling out to the northward, and opening the high light to the eastward of the low light, till you come into 16 or 18 fathoms.

FOR SAILING WITHIN THE LIGHT, or ANCHORING IN THE ROADS, IF BOUND TO THE NORTHWARD.—In case you prefer going through the Inner Sound, having passed the high light on the Farn, bring it S.E. $\frac{1}{2}$ S., and keep it so until you have the light on the Longstone E. $\frac{3}{4}$ S., to avoid the Swadman, and the reef which extends to the westward of the Megstone; and when you have these two lights on the above bearings, or can see Bamborough Castle about S.W. by W., and can make good a N.N.E. course, you may haul to the eastward, and bring the high and low lights, uponthe Farn in one, proceeding in that line, as before described; but if you have any doubt of regaining this line, by either of those passages, it will be necessary to anchor, if the wind is E. by N., or more northerly, under the Farn Islands, the high light bearing N.N.W., distant about 3 cables' length, in 8 or 10 fathoms. If more easterly, proceed for Scate Road, off Warnham Flats, by steering N.W. from the high ligh on the Farn, and keeping it S.E., until the light on the Longstone bears E. by S., or Bamborough Castle bears S. by W., in 7 or 8 fathoms; where, if forced from your anchors, you stand the best chance of saving both your lives and property.

FOR SAILING WITHIN THE LIGHTS TO THE SOUTHWARD.—When, in proceeding from the northward to the southward, after having passed St. Abb's Head, you are prevented, by heavy gales from the eastward, from hauling into 30 fathoms water, as in the foregoing supposition; and falling into 16 or 18 fathoms, with heavy gales upon a lee shore, you are not able to get to the eastward (the wind being at east or E. by N.,) you had better tack to the northward, and keep the Frith of Forth open, than attempt to proceed; but if, from the appearance of the night, it is judged prudent to proceed, you ought not to come into less than 16 or 18 fathoms, to avoid the shoals north of Holy Island, until you make the lights.

If then, at a great distance, you do not see the low light, keeping the high light on the Farn about S. $\frac{1}{2}$ E., will take you to the eastward of the leading-line, to avoid the above shoals; and upon making the low light, if it be to the westward, you may edge off to the westward, until you have the two lights in one, as before described, which will take you between the Goldstone and the Plough; and you may thence proceed in that line until you have the light on the Longstone S.E. $\frac{2}{3}$ E., when, if you can, haul to the eastward, so as to bring the high light as much to the eastward of the low light as their difference of height (as before); you may proceed in that direction of the lights, to pass to the eastward of the Megstone; and from the Megstone, to steer so as to pass $\frac{1}{2}$ a cable to the westward of the light on the Farn.

If, when the light on the Longstone bears S.E. $\frac{2}{3}$ E., being in the line of direction of the two lights, you cannot haul up to the eastward, and find it advisable to anchor in Scate Road, steer for it S.W. $\frac{1}{2}$ W., until you have the bearings of the lights, as before mentioned, in 7 or 8 fathoms; or, if you mean to proceed through the Sound, in that case, instead of steering S.W. $\frac{1}{2}$ W., steer S.S.W., until you bring the high light on the Farn S.E. $\frac{1}{2}$ S., which you may then steer for, and it will take you to the westward of the Swadman; when, passing $\frac{1}{2}$ a cable to the westward of the Farn, you may safely proceed to the southward.

GENERAL CAUTION.—These directions are given, supposing it be night-time, and stormy weather; but they may be useful in the day-time also; however, it cannot be too earnestly impressed on the minds of all who have charge of vessels passing this intricate navigation (except the constant traders to and from Berwick), not to involve themselves among these islands, either by day or night, with favourable or with contrary winds.

From EMANUEL HEAD TO BERWICK.—From Emanuel Head to Berwick the course and distance are N.N.W. $\frac{3}{4}$ W., 8 miles; to Whapness N. by W. $\frac{1}{2}$ W., 5 leagues; and to St. Abb's Head N. by W. $\frac{1}{4}$ W., 19 miles.

Vessels steering northward from Emanuel Head, by keeping that point in one with Budle signal-house, S. $\frac{3}{4}$ W., will clear all the shoals in Berwick Bay; and when Berwick lighthouse bears N.W. by W. $\frac{1}{4}$ W., you may steer directly towards it.

BERWICK is a fortified town, situate on the N.E. banks of the River Tweed, having a spire on the town hall, in latitude 55° 46′ 21″ north, and longitude 1° 59′ 41″ west; and to the northward of the town an octagonal building, called the Old Bell tower, which, together with the Magdalen Field House, are all conspicuous sea-marks.

Berwick is connected to the town of Tweedmouth, on the southern side of the river, by a bridge of 15 arches; but in summer the stream is so inconsiderable that it frequently only occupies two of them.

On the south side of the river is a *large sand-stone rock*, called the *Carr*, projecting from the shore, round which is the deepest water, and best anchorage in the river. Vessels generally moor there with a fast to a ring in the rock, and an anchor in the stream. The southern side of the entrance into Berwick is a sandy bay, but the north side has a *reef of rocks* that dries a long way out, along which a pier runs out above 800 yards in length, having on the pier-head a lighthouse, which exhibits two fixed lights, the higher one is lighted through the night, but the lower one, which is a red light, is only shown when there are 10 feet water upon the bar. The tide light, in clear weather, may be seen 8 miles; but the high light will be visible 11 miles, according to the state of the atmosphere.

The following Directions for Berwick Harbour, are by Commander E. J. Johnson, R.N.

"VESSELS which have not made the land, should never attempt to run for Berwick Harbour in thick weather, but should keep at sea, in not less than 35 fathoms; and when they have made a good landfall, and reached the vicinity of the harbour, they should not go into less than 18 fathoms, till the proper time of tide. This is indicated at night by showing the red tide light, when there are 10 feet water and upwards on the bar. A pilot should be considered as indispensable, for the heavy freshes down the river, when opposed by strong easterly gales, materially change the position of the sands at the entrance; and, with or without a pilot, the lead must be particularly attended to.

"In approaching the harbour from the northward, the two northern Scremmerstone windmills kept in a line S.S.W. $\frac{1}{2}$ W., clears all the rocks to the north of the pier, until the harbour's mouth is open, and the lighthouse bears N.W. by W. $\frac{3}{4}$ W.; but it is important that those who may approach Berwick from the northward at night, should be informed that it is an error to suppose that the pier light can only be seen by vessels which are outside of the Seal Carr, for its reflection sometimes appears almost like a steady light, and can be distinctly seen even by a person on Sharper's Head: the light should, therefore, never be brought to the southward of S.W. by S.; it may also be remarked, that in running from the northward during the night, a light at Berwick Hill Colliery is sometimes perceptible, and some caution is therefore necessary not to mistake it for Berwick pier light.

"The lighthouse on Berwick pier must be brought to bear N.W. by W. $\frac{3}{4}$ W., when the entrance of the harbour is to be attempted; and previous to such attempt, the time and set of the tide must be duly considered.

"The sands at the mouth of the Tweed shift so frequently, that permanent marks cannot be given, and the pilots are obliged to examine and sound the entrance after every gale. Nevertheless it may be useful to know, that, in general, Tweedmouth Church steeple kept in a line over the centre of a roof of a red-tiled house, situated directly to the eastward of the chancel window, bearing N.W. by W. $\frac{3}{4}$ W., will lead over the bar, and abreast of the lighthouse, at the distance of about $\frac{1}{3}$ of a cable. From thence a course should be made parallel with the pier, nearly as far as its inner elbow, but avoiding the *Crab Water Rock*, which is cleared to the west by keeping Berwick spire just open to the west of the King's bastion, near the flagstaff. The vessel must then steer to the S.W., till abreast of the Preventive mast on Spittal Point, when a course may be shaped along the beach on the western side so as to round its curve till near the Carr Rock, where the best anchorage will be found.

"In approaching Berwick Harbour from the southward, Budle Hill signal-house must not be shut in with Emanuel Head, till the lighthouse on Berwick pier bears N.W. by W. $\frac{1}{4}$ W., in order to avoid the outer shoals; then steer for it till within 2 miles, but do not go nearer than 8 fathoms, till a pilot comes on board.

"During the night the Longstone light ought not to be brought to the eastward of S.S.E., nor the Farn high light to the eastward of south, till Berwick light shall have been brought to bear N.W. $\frac{1}{2}$ W.

"During westerly winds vessels may anchor in the offing till the tide serves for en-

tering the harbour, in the following positions:—In the inner stopping-place, in 4 fathoms at low water, on a sandy bottom, with the Old Bell tower in a line with the house at the west end of the pier, N. by W. ½ W., and Fair Steeds in a line with the Bear's Head Rock; Berwick light will then bear N. ¾ W., about ½ a mile, and Hud's Head S.W. by W. Or they may bring-up in the outer stopping-place, in 8¾ fathoms, on a sandy bottom, with Berwick spire in a line with the lighthouse N.W. ½ N. (the latter distant a mile); and Fair Steeds halfway between the fishing shiel on the bank side, and the Bear's Head."*

From BERWICK to ST. ABB'S HEAD.—About a mile to the northward of Berwick is Bottleness, a point with a *reef* stretching from it to seaward about 2 cables' length, and partly above water. From hence to Whapness, the course is N. ½ W., about 2 leagues. On the west side of Whapness is Aymouth, or Eyemouth. The land between Berwick and Eyemouth is called the Island of Ross, and has a remarkable long and regularly high appearance. Whapness is a low rocky point, with a beacon and high land behind it. Eyemouth is a tide-haven; and, like Berwick, subject to the freshes, which must be carefully guarded against. From Whapness to the opposite side of the bay, a high rocky steep point, with a fort upon it, is distant only ¼ of a mile; but a little outside, and directly in the fairway, are *several rocks* above water, dividing it into two channels. To sail into Eyemouth, you must keep in the midway of one of these channels, as best suits the prevailing wind; and when you are well within them, steer close to the beacon fixed on the port side rocks, and then run into the harbour; but be guarded against the freshes. Great quantities of fish are cured at this place, and many vessels take in grain.

EYEMOUTH HARBOUR LIGHTS.—These lights were erected for the benefit of the fishermen frequenting the Port of Eyemouth during the herring season. The brightest of the two lights is erected on a post, about 26 feet from the ground, and is seen at a distance of more than 6 miles. The smaller light is placed at the pier-head; and whilst it indicates the entrance to the harbour, it is in such a position relative to the other light, as to afford a leading-mark, when the lights are brought in one line, for the best passage into Eyemouth Bay. They will be found useful, not only to vessels trading with Eyemouth, but sailing along the coast, by distinctly informing them where they are, and enabling them, if necessary, to run at night into the bay for shelter. (Uncertain if now exhibited.)

At ½ a mile N.W. of Eyemouth, vessels may anchor in a small spot under the high cliff, about ¼ of a mile from shore, in 14 or 16 fathoms; but this place will be rather difficult for a stranger to find.

From Bottleness to St. Abb's Head the course is nearly N. ½ W., distant 3 leagues, and the shore generally foul and rocky, with 20 and 22 fathoms close to it, and 30 fathoms farther off; therefore, as you advance towards the Head, it will be requisite to give Bottleness a good berth; and you may then steer on for St. Abb's Head without danger.

ST. ABB'S HEAD, whether in approaching it from the southward or northward, first appears like an island. It is a high and remarkable promontory, and will be easily distinguished.

TIDES.—On the full and change days of the moon it is high water at Scarborough at 4h. 15m.; at Whitby, 3h. 45m.; at the mouth of the Tees and at Hartlepool, 3h. 30m.; at Sunderland, 3h. 15m.; at Tynemouth Bar, 3h.; at Blyth and Coquet Island, 2h. 45m.; at Farn Island, 2h. 40m.; at Holy Island Harbour 2h. 30m.; at the Longstone, 2h. 41m.; at Berwick and Eyemouth, 2h. 18m. The tide rises at Scarborough, 18 feet springs, 8 feet neaps; at Whitby, 15 feet springs, 10 feet neaps; at the mouth of the Tees, 16 feet springs, 10 feet neaps; at Hartlepool, 18 feet springs,

---

* The following is an extract of a letter received at Lloyd's, from their agent at Berwick, the perusal of which will be found of importance to all mariners:—"It cannot be too generally known, that there is always a risk in taking Berwick Harbour with a strong wind from the north, particularly if there is a roll of the sea, and a fresh in the river; for, as soon as vessels turn in round the pier-head, they are apt to lose the wind and steerage-way; and should they not borrow close to the pier, and immediately let go an anchor, there is every chance of their being drifted on to Spittal Point."

10 feet neaps; at Sunderland, 16½ feet springs, 9 feet neaps; at Tynemouth, 15 feet springs, 8 feet neaps; at Blyth, 13 feet springs, 7 feet neaps; at Coquet Island, 15 feet springs, 9 and 10 feet neaps; at Farn Island, 16½ feet springs, 9 feet neaps; at Holy Island Harbour, 16 feet springs, 11 feet neaps; at Berwick and Eyemouth, 15 feet springs, 10 feet neaps.

The stream of flood sets to the southward from St. Abb's Head, past Eyemouth and Berwick, towards Emanuel Head, continuing to run at the distance of about 2 miles from land, 2 hours after the time of high water on the shore; this tide runs at the rate of from 1 to 1½ mile an hour, parallel to the shore, all the way to Emanuel Head. At Emanuel Head its strength increases; and it sets along the Holy Island shore, towards Bamborough Castle, at the rate of 3 knots with spring-tides. From the bar of Holy Island, the flood sets strongly into the harbour; but outside of the bar, it sets towards Warnham. Between Emanuel Head and the Longstone, the flood sets for the inside of Farn Island; but near the Longstone, for the passage between the Staples and Farn Islands, where it runs with great rapidity. Vessels passing near should attend to this, that they may not be drawn in with it, in light winds.

Between the Megstone and the main, the flood runs parallel to the shore, increasing in strength until between Farn Island and Islestone, where spring-tides run nearly 5 knots; and with southerly or S.E. winds make a frightful sea, appearing like breakers. The streams of both flood and ebb are necessarily driven out of their respective courses, on the approach to the islands, or other obstructions, by which they will be occasionally retarded or accelerated: thus the tide will be divided as it approaches towards the Wamses, part of the stream being forced between the Farn and Staples, and also between the Farn and Wide Open; while that portion of the water which is not affected by those channels, runs between the Megstone and the N.W point of the Farn Island. Here this point drives the water towards the main land, forming a curve, extending sometimes half-way between the island and the main; but increasing and decreasing, according to the velocity of the stream, which will be affected by the spring and neap-tides, by gales of wind, &c.

The Islestone rocks also much interrupt the course of the in-shore stream, forcing the water to the eastward, where spring-tides run 5 miles an hour. The outer part of the stream of flood is forced to the eastward, from the north part of the Wamses, running through the openings, among the rocky islands which lie between the Wamses and the Longstone. These openings mostly become dry about half-ebb; but the water that does not pass through these openings sets easterly, until it has passed the north point of the Longstone; when, being joined by the main tide, it rushes rapidly between the Longstone and Knavestone, and again resumes its southerly course. When abreast of Sunderland Point, the whole body of the stream appears to re-unite; and, recovering the interruption occasioned by the various impediments, pursues its coastwise direction to the southward.

On the south side of the Farn Islands and the Scare Crows, between the streams of the two passages, there is an eddy during the flood, where, with a contrary wind, a vessel may turn, or anchor in 10 or 12 fathoms water, on clean sand, till the tide changes. There is, however, a considerable and rapid stream between the Wide Open and the Farn, which continues an hour after the flood has made; and this, in turning, must be particularly attended to.

There is necessarily an eddy on the south side of all the islands, during the flood, and on their north sides during the ebb; but about an hour after the flood has made, streams of considerable force, come through the openings of all the rocky flats, many of which become covered about that time. Wherever there is an eddy, it causes a rippling, like broken water passing over shoals; and when the wind is in opposite direction to the tide, it has a visible effect all round the islands; and on the south side of the Farn, with the flood eddy, the sea, with south-east gales, breaks with great violence.

The EBB-TIDE.—The in-shore part of the ebb sets from Sunderland Point for the inner part of the Farn Island; and the outer part towards the passage between the Farn and Staples. As it approaches the islands, it is divided between the south point of the Wide Open, part running into the channel between the Farn and Staples, and between the Farn and Wide Opens; and part flowing towards the S.W. part of the Farn; where, curving to the westward, it winds again into the passage between the Farn and Megstone, and between the Megstone and Ox Scar, the in-shore part passing along the coast, and between the Megstone and the main.

At the point of Staples Island the ebb also divides near the Pinnacles, part running between the Farn and Staples, and the other taking an easterly direction from the Pinnacles towards the Longstone; then passing the south end of the Longstone, it joins the main tide, and runs through between the Longstone and Knavestone. Close to the Longstone there will be an eddy, caused by the velocity of the water passing its southern point.

About 5 leagues off the Staples, the flood-stream runs to the southward, till 5h. 45m.; and at about 8 or 9 leagues off Coquet Island, it runs till 6 o'clock. Off Whitby the flood-stream continues to run till 6h. 30m.; and off Flamborough Head till $\frac{1}{4}$ past 7 o'clock.

In the offing, at 4 miles from the land, the stream runs full 3 hours after it is flood on the shores. Gales of wind, from between W.S.W. and N.W., raise the tide higher, and occasions the flood to run longer; while easterly and S.E. winds have an opposite effect.

FROM ST. ABB'S HEAD TO BUCHAN NESS.

Description of the Land, &c.

From ST. ABB'S HEAD *to* FIFE NESS, *including the* FRITH OF FORTH, *commonly called* EDINBURGH FRITH.

ST. ABB'S HEAD takes its name from a chapel situated there, and is a lofty promontory, or headland, steep-to, and making like an island. The adjacent shore is rocky and cliffy, the tide runs by it with a strong current, and little wind makes a heavy sea. Close to its point is deep water; and a little from it are 30 and 40 fathoms. It is in lat. 55° 55′ 30″ N., and long. 2° 8′ W.

N.W., 3 miles from St. Abb's Head, is Fast, or Fal's Castle, in ruins, standing upon a ragged rocky point of land, called Lumsden Head. The coast between St. Abb's Head and Fast Castle is all steep, with high cliffs, which continue considerably farther to the westward, then fall down to low land as far as Dunbar, the whole being *foul* and *rocky*.

DUNBAR.—The course and distance from St. Abb's Head to Dunbar, are N.W. $\frac{1}{2}$ N., $13\frac{1}{2}$ miles. This town is situated within a low rocky point; it has a pier-harbour, the bottom being of solid rock. On the west side of the harbour are the *Staple Rocks*, some of which are always visible, having deep water close to them. Vessels may anchor about a mile off Dunbar, in 7 or 8 fathoms water; but the customary roadstead is directly abreast of the piers, in 10 or 12 fathoms, sandy ground. The entrance between the piers is narrow; and when there is any kind of breeze, it brings with it a rolling sea; so that, unless in easy weather, to sail into the harbour becomes difficult. In 1844, great improvements were made by a breakwater and new harbour, and the entrance deepened to 21 feet, with 17 or 18 feet at the north pier.

At $2\frac{1}{2}$ miles N.W. from Dunbar, is Whitberry Ness, a low downy point, with a nob upon it called Baldrin's Cradle. Between, there is a deep sandy bight, leading to Tyningham River; it is filled with *shoals*, and called *Tyningham Flats*, drying to a considerable distance off, so that it must have a good berth in passing.

The BASS is a *remarkable rock*, situated on the southern side of the entrance to the Frith of Forth. It is almost a mile in circumference, high, round, steep on all sides, and of a white appearance, occasioned by the dung of innumerable birds which resort there. Close to its sides are 15 fathoms, and about a mile off it 23 fathoms. The passage between it and the shore is full a mile wide. The ground is rocky; but there is a depth of from 9 to 12 fathoms within it. The Bass Rock lies N.W. by N., 19 miles from St. Abb's Head; N. by W. $\frac{3}{4}$ W., 6 miles from Dunbar; and S.W. $\frac{3}{4}$ S., 12 miles from Fife Ness.

At 2 miles N. by W. $\frac{1}{2}$ W. from Whitberry Ness is the point of Scougall, or Seacliff; between these are the sandy flats already mentioned. A *reef of rocks* stretches off the point, called the *South Carrs*, and the coast hereabout is steep, rocky, and foul; the South Carrs are *dangerous*, stretching out full $\frac{1}{2}$ a mile from the point, chiefly drying at low water. They lie about $4\frac{1}{2}$ miles N.N.W. from Dunbar, and a mile to the eastward of Tantallan, an old fort in ruins. The Carrs are steep-to, having 7 fathoms on their outer side. During the flood-tide, a strong indraught sets over them towards the flats, which, with N.E. winds, has rendered them fatal to many ships; the mariner should, therefore, be particularly careful in passing them. A beacon, of masonry, has been lately erected on the South Carr Rocks, having a large cross at the top of it.

NORTH BERWICK.—From the Carrs to North Berwick, the shore continues *foul* and *rocky* full a cable's length from the land. W. $\frac{1}{2}$ N., about $1\frac{3}{4}$ mile from the Bass, and nearly

$\frac{1}{2}$ a mile from the shore, is the *Stub Rock*. Inland, about $\frac{3}{4}$ of a mile from the town, is a round hill, called North Berwick Law, which is remarkable, and serves to distinguish this part of the coast. On the western side of North Berwick are some *rocks*, lying above $\frac{1}{2}$ a mile from the shore, some of them being always above water.

Craig Leith is a round *rocky* islet, steep on all sides, about a mile from the shore. It lies W.N.W., $2\frac{3}{4}$ miles from the Bass Rock, and has a good passage between it and Berwick Rocks.

Lamb Island lies about a mile to the westward of Craig Leith, and is much nearer the shore. There is deep water between them; but towards the shore it is *foul* and *rocky*.

Fidra is a *black rugged rock*, having a hole through it, of singular appearance, and lies N.W. by W. from Lamb Island, distant a mile; and W.N.W. from Craig Leith, distant 2 miles. The ground all round it is *foul* and *rocky;* and the *Bridge*, a *long reef* running from it towards the shore, affords not even a passage for boats. These rocks dry at low water.

The Ibris is another *dark-looking rock*, lying to the westward of Fidra, distant about a mile, being nearly $\frac{1}{2}$ a mile from the shore, to which it is joined by shoal water, so as to prevent any passage between. It is *foul* on the outside. About $\frac{1}{2}$ a mile to the northward of these rocks, are 10, 12, and 14 fathoms; and farther off, in the Frith, are 24 and 26 fathoms. May Island lies towards the opposite side; but as it forms a conspicuous object for the entrance into the Frith, we give a description of it here:—

MAY ISLAND lies 7 miles N.E. $\frac{1}{2}$ E. from the Bass; N. by W., $20\frac{1}{3}$ miles from St. Abb's Head; N. by E. $\frac{3}{4}$ E., $10\frac{1}{3}$ miles from Dunbar; and S. by W. $\frac{1}{2}$ W., $5\frac{1}{4}$ miles from Fife Ness. This island is nearly a mile in length, rocky, but steep-to all round except towards its northern part, which shoals at low water full $\frac{1}{2}$ a cable's length out.

On this island is a lighthouse, in lat. 56° 11′ north, and long. 2° 33′ west, on the highest part of the island. It is built of stone, and is 57 feet in height from the base to the lantern, which is elevated 240 feet above the level of high water, at spring-tides. The present light is known to mariners as a bright fixed light; and may be seen from all points of the compass at the distance of about 7 leagues; and at all intermediate distances, according to the state of the atmosphere. Between this island and the Bass, the depth is about 25 fathoms mid-channel; and between it and the Fife shore 14 to 20 fathoms.

A new lighthouse has been erected on May Island, as a guide for the North Carr Rock. This leading-light is fixed, and of the natural appearance, and is placed on a tower, about 130 feet below the level of the former light. The lights will be seen distinctly separate, the one above the other; and when in a line, they bear N.N.E. $\frac{1}{4}$ E. and S.S.W. $\frac{1}{4}$ W., distant 250 yards, and lead about $\frac{1}{2}$ a mile to the eastward of the North Carr Rock. The light must on no account be opened to the westward.

ABERLADY.—W.S.W. $\frac{1}{2}$ W. from Ibris, distant $2\frac{1}{2}$ miles, is Gullan Ness. Between Ibris and Gullan Ness the shore is sandy and flat; but Gullan Ness Point is *rocky;* and a *bank* runs from hence along shore, all the way to Leith. The space to the westward of Gullan Ness is commonly called Aberlady Bay. About 2 miles to the northward of Aberlady Bay the soundings are $5\frac{1}{3}$ to 6 fathoms, the depth decreasing as you approach the shore; bottom sand and shells. A mile beyond Gullan Ness is Haddington Port, running to Aberlady and Luff Ness. At 4 miles from Aberlady is Cockenzie; and a mile beyond that is Preston Pans. The coast then runs in nearly a W. $\frac{1}{2}$ N. direction to the River Esk, and thence N.W. $\frac{1}{2}$ N. to Leith, the whole having a *sandy flat* stretching out in some places a full mile from the shore. From Leith a similar *sandy flat* continues running in a N.W. direction to Cramond Island.

INCH KEITH is a small island, situated nearly in the middle of the Frith, between Leith and Kinghorn Ness, $\frac{3}{4}$ of a mile long, and narrow, lying about north and south. On the highest part of it, near the north end, are the ruins of a fort; and near the middle of it is a lighthouse. Off its south end is a narrow *black rock*, always above water, called *Lang Craig*. From thence a *reef of rocks*, called the *Brigs*, which are seen only at spring-ebbs, extends S. by E. $\frac{1}{2}$ E., $\frac{1}{3}$ a mile, separated only by a narrow channel, of 14 or 15 feet at low water. The east end of this island is steep-to; but a *black rock* off the N.W. point of the island has a *reef*, stretching 2 ships' length from it to the westward. The western side is also foul, many of the rocks being visible at low water.

Inch Keith lighthouse has a revolving light, every minute showing a bright glare of 10 seconds' duration. In clear weather the light is not totally eclipsed between the flashes, at a distance of 4 or 5 miles. The lantern is elevated 220 feet above the level of the sea, and may be seen from all points of the compass 18 miles.

From Inch Keith lighthouse, Elie Ness bears E. by N., distant $14\frac{1}{4}$ miles; May Island light east, $21\frac{1}{4}$ miles; Fidra E.S.E. $\frac{1}{3}$ E., 12 miles; Leith pier-light, S.W. $\frac{1}{2}$ W., $3\frac{1}{2}$ miles.

The Herwit.—To the southward of the Brigs of Inch Keith, is the Herwit, *another reef*, seen at spring-ebbs, which stretches S.E. by S., nearly $\frac{1}{2}$ a mile from the Brigs. Between these is a channel, of 3 fathoms at low water; and close to the outer point of the Herwit, on which a black buoy is placed, are nearly 15 fathoms water, which shoals off to the southward.

The North Craig lies nearly in the middle of the south channel to Leith, and consists

of *craggy rocks*. It is about a cable's length from east to west; but not so much from north to south. Over it are $3\frac{1}{4}$ fathoms at low water. A pyramidal, or mast-buoy, is placed on it, chequered red-and-white. This rock lies about $2\frac{1}{2}$ miles S.E. $\frac{1}{2}$ S. from Inch Keith lighthouse, its marks being, Nelson's monument, on Calton Hill, on with the west part of the easternmost house on the beach, east of the glass-houses, bearing W.S.W. $\frac{1}{2}$ W.; the buoy of the Craigwaugh S.W. $\frac{1}{4}$ W.; and the buoy of the Herwit N.W. by W. $\frac{1}{2}$ W.

The Craigwaugh is a *small round rock*, having only 4 feet water on it, lying S.S.E., distant $1\frac{1}{2}$ mile from the Herwit, and 2 miles in the same direction from the Lang Craig. It appears about a ship's length over; and the weeds upon it are always visible. On its northern end is a red buoy. These three buoys mark the boundary of the south channel to Leith.

The GUNNET lies W. $\frac{1}{2}$ N., $1\frac{1}{2}$ mile from the Inch Keith lighthouse, and is formed of *two rocks*, joining each other, having a white buoy at each end: over them are 9 and 10 feet water.

ENTRANCE TO LEITH.—On Leith Sands, to the eastward of the pier, lie the *Leith Craigs*, visible at half-ebb. Near the outer end of the sands, N. by E., nearly $\frac{3}{4}$ of a mile from the pier-head, and N.W. from Leith Craigs, lie the *Beacon Rocks;* these appear at two-thirds ebb, and have a Martello tower erected upon them. Directly N. $\frac{1}{2}$ W. from the craigs is *Symond's Reef*, with only 3 or 4 feet water over it, extending to the distance of 2 ships' length. The tide here ebbs out full $\frac{3}{4}$ of a mile from the shore; but the edge of the bank is steep-to.

LEITH HARBOUR has been lately much improved. A new pier is now run out, 1,500 feet from the point of the old one, by means of which, vessels get into smooth water in easterly gales, where it is considerably deeper than formerly. From the point of this new pier a wear is constructed, which extends about 1,200 feet seaward, terminating about 200 yards to the westward of the Martello tower. Buoys are laid along the line of this wear, which are to be kept on the port hand in entering the harbour.

A western pier, or breakwater, has been also built, extending from the western bastion of the docks, to meet the eastern pier, at about 100 feet from the extremity; but stopping, and leaving an entrance of 250 feet. By the breakwater, the harbour is sheltered from northerly winds.

The harbour has gained considerably in depth, in consequence of the improvements. The average depth at high water, spring-tides, is 17 feet; and at neaps, 13 feet in the fairway. At the new pier-head there is full a foot more.

A fixed light is shown on the eastern pier, and also on the extremity of the western pier. When 8 feet, a green light will be shown under the light on the western pier, and when the Victoria Dock gates are open the green light is changed to red. On both dock heads, *when open*, a red light is exhibited.

At Newhaven, west of Leith, a stone-pier runs out, from which the sand dries to the eastward so far as the Martello tower. Here a *small fixed light* is exhibited on the pier, of a *red* colour; but only shown when the passage-boats ply in the night: it, however, may be seen 2 or 3 miles off. To the westward of Newhaven is a chain pier, used chiefly by the coasting-steamers, which also exhibits a red light at night. Granton pier, built at the expense of the Duke of Buccleugh, is about a mile west of Newhaven. It is 1,700 feet in length, and 80 in breadth. During the night, a red light is shown from the end of the pier.

Vessels may anchor off Newhaven with Hound Point open midway between Cramond Island and Mickry Stone, in $5\frac{1}{2}$ fathoms at low water; or with Edinburgh Castle open to the westward of Newhaven; and Barnbug Hall open to the northward of Cramond Island, in 5 fathoms at low water. Large ships should anchor with the white-house a ship's length open of Cramond Island. The ground is reckoned good. To the eastward of the road is a *ledge of rocks*, which must be left on the port hand in going to Leith Harbour. A beacon is on its outer end, and it is dry at low water.

At 2 miles beyond Barnbug Hall is Queen's Ferry, where a light is usually shown in dark weather, for the convenience of landing passengers from the steamers.

NORTH SIDE OF THE FRITH.—Kinghorn Ness lies about 2 miles N. by W. from Inch Keith. The shore is steep and rocky, with 22 and 20 fathoms about a mile from the former. To the westward of the Ness is Petticur, or Kinghorn Harbour. The town of Kinghorn lies northward of the Ness.

A rocky flat, called the *Blea*, with $2\frac{3}{4}$ fathoms on it at low ebbs, lies a mile S.E. $\frac{1}{2}$ S. from Burnt Island; the tide runs with great rapidity across it, and makes a strong rippling.

Burnt Island lies about 2 miles W.N.W. $\frac{1}{2}$ W. from Petticur pier. Between them is a *sandy flat*, drying at low water, with 9 and 10 fathoms near its southern edge. Between it and the Gunnet are 18 and 22 fathoms mid-channel; and a similar depth continues up channel as far as Inchcolm.

Burnt Island Harbour is a good place for vessels when bound to the southward; for they may proceed from hence, when they cannot get from Leith Roads with a northerly wind. There is no danger in entering unless you run against the piers; keep in the middle between them, and have an achor ready to let go. By thus keeping the piers open, you will avoid the rocks to the eastward of the harbour. When in, you will ride over a bottom of sand, which dries at low water. The shore at Burnt Island is steep-to, and continues so to Stanley Burn. On the

eastern pier is a harbour light, and a small fixed light on the Ferry Pier, both shown throughout the night.*

About 2 miles N.E. ½ E. from Kinghorn Ness, is the Bay of Kirkaldy. A mile from Kinghorn town is Seafield Castle, or tower, in ruins; abreast of which, some *pointed rocks* run out ⅓ of a mile, called the *Vows;* some of these are above and some under water. There are 4¾ fathoms close to their southern sides. The coast from Kinghorn Ness to the Vows is much encumbered with rocks, being steep-to.

KIRKALDY HARBOUR LIGHTS.—A fixed light is shown on the N.E. side of the entrance, also a small red-and-white light at the entrance, on the pier-head.

Kirkaldy bay is clean, in from 11 to 6 fathoms water; and so is the coast thence so far as Largo bay, if you keep within the above depth, but otherwise the ground is foul. A little to the eastward of Dysart is Ravensheugh, a small tide-haven, to the south-eastward of which, and nearly ½ a mile from the nearest shore, is *Dysart West Rock Head*, about 20 fathoms in length, with 8 feet water on it at low ebbs, and 3 fathoms close to it.

West Rock Head Buoy, *off Dysart.*—A 6-feet buoy (red) has been placed on the West Rock, it lies in 3¼ fathoms at low water, with Dysart coal-pit chimney-stack, in line with the middle of the gable of Pan Hall house, N. ⅓ E.; north end of Portbrae Church, Kirkaldy, just clear of the end of Kirkaldy pier, W.N.W. ¾ W.

N.B.—The highest part of the rock bearing N. ¼ E., distant about ½ a cable's length from the buoy.

Nearly ¾ of a mile north-eastward of the latter rock is the *East Rock Head*, being ¾ of a mile from the shore, with only 6 feet on it at low water. Its marks are, the ruins of West Wemys on with the ruins of the castle at East Wemys. The thwart-mark is, the old mill at Dysart, seen over the engine brae.

East Rock Head Buoy.—A 6-feet buoy (black) has lately been placed on the East Rock, off Dysart; it lies in 3¼ fathoms at low water, with Wemys old castle, in line with the southern house of East Wemys, N.E. by E. ¼ E.; east wing of Dysart Church, in line with the town-house steeple, N.N.W. ¾ W.; West Rock Head buoy W. by N. ¼ N.; and Inch Keith lighthouse S.W. ½ S. The highest part of the rock bearing N.W. ¼ W., about 2 cables' length.

By keeping out in 7 fathoms, you will avoid both the latter rocks. Farther on are West and East Wemys, Buckhaven, Methel, and Leven, all tide-havens, and places of small note. The latter is distant 10 miles N.E. by E. ¾ E. from Kinghorn Ness. From Dysart to Leven, the shore is rocky throughout, and foul a full cable's length off; but you may anchor all along this coast between the depths of 5 and 10 fathoms, from Kinghorn to Largo.

LARGO BAY is that space between Leven and Ruddon's Point, the land there forming a considerable concavity. Ruddon's Point lies S.E. by E. ½ E. from the entrance of Leven River, distant 4 miles. The anchorage in the bay is good, in from 6 to 10 fathoms; the bottom being sand and shells, except on the north-eastern side, where it is somewhat foul.

To the eastward, 2½ miles from Ruddon's Point, is Elie Ness, a conspicuous promontory, and between these are *two rocks*, called the *East* and *West Vows*, visible at half-tide, and have from 4 to 5 fathoms near them. There is also *another small rock*, a short distance to the eastward of the Vows, called the *Thill Rock*, which appears at low ebb. Here are the town and harbour of Elie, a tide-haven, with a pier, or landing-place, considered tolerably good, and much frequented. It lies within the first point to the N.W. of Elie Ness.

East Vows Rock Beacon, *off Elie.*—A pyramid of iron pillars, with open cylinder cage on top, it is painted *red*, and erected on a *rock*, which dries at low water, with the ruins of Chapel Ness bearing N. ¾ E.; north end of Elie pier E. ¾ N.; West Vows Rock, W.N.W. ½ N., distant ½ a mile, and the buoy on Thill Rock E.S.E. ⅛ S., distant 2 cables' length.

Thill Rock Buoy.—This is a 7-feet black buoy; it lies in 3¾ fathoms, with the west end of Mill House cottage in line with the north end of Elie pier, bearing N.E.; Pettie Law in line with the west chimney-stack of David Overstone's house N. ⅜ W.; and East Vows beacon, W.N.W. ⅛ N. This buoy lies 35 fathoms to the S.S.E. of the highest part of the rock.

Elie Ness lies E. ¼ N., 14 miles from Kinghorn Ness; N. by W., 8½ miles from the Bass Rock; and N.W by W. ½ W., 8½ miles from May Island lighthouse. Chapel Ness lies ¾ of a mile westward from Elie, and Kingcraig Ness N.W. ¼ W., a mile from Chapel Ness.

Kingcraig Ness is a *rocky point*, and foul some distance off; over these points (Chapel Ness and Kingcraig Ness) is seen the Heugh, a remarkable object, being a high green bank near the shore, and visible even by night.

The shore from Elie Ness to Fife Ness is generally rocky and foul. About a mile from the latter is a *sunken rock*, called the *Ox*. It lies about half a mile from the land, and dries at spring-tides. Keep Kinghorn Ness open of Elie Ness, and you will go clear to the southward of it. On the shore are the small tide-havens of St. Monance, Pittenween, and Anstruther. We have already said that the shore is rocky and foul a cable's length out or more, but particularly at Billy Ness, near the west side of Anstruther; be careful, therefore, not to come too near, for there is deep water all along. There is a beacon on the shore half a mile eastward of Anstruther.

* For further directions up the Frith of Forth, see the instructions which accompany the larger scale Charts.

A fixed red light is shown on the pier-head at Pittenween, and another on the south corner of the wall in Abbey Park. There are also two red lights on the west pier at Austruther.

At $3\frac{3}{4}$ miles to the east-north-eastward of Billy Ness is the town and tide-haven of Crail; and farther on, about 2 miles, is Fife Ness, the north-eastern point of entrance to the Frith of Forth.

FIFE NESS, in latitude 56° 17′ north, and longitude 24° 35′ west, is steep-to on its southern side; but W.S.W. from it, is a high black stone, called Kilmenie Craig, which forms a remarkable object. The shore between is foul a full cable's length off. N.E. $\frac{1}{2}$ E., a mile from Fife Ness, is the *North Carr*, a most *dangerous ledge of rocks*, stretching in the above direction about a mile; it dries at the last quarter-ebb, and the *outer rock* appears to be about the size of a boat; being steep-to on its south and south-eastern sides, having 12 fathoms close to it; but with a *little reef* running out from it towards the north. To go clear to the southward of the North Carr, you should keep Kilmenie Craig in sight, and open of the land. To go to the eastward, keep Traprene Law, (a hill on the south side), its apparent breadth to the eastward of the Bass Rock. In the night, approach no nearer to it than 16 or 15 fathoms. The two lights on May Island in one, bearing S.S.W. $\frac{1}{4}$ W., lead half a mile eastward of the North Carr Rock. To clear it to the northward, bring either of the steeples in the town of St. Andrew's open of Babert Ness. The battlement of Crail steeple, kept in sight above the land, is also a good mark to clear it to the eastward. The Carr Rock bears from the Bell Rock S.W. by W. $\frac{3}{4}$ W., distant 10 miles, and from the Island of May lighthouse N.N.E., $6\frac{1}{2}$ miles.

A beacon is erected upon the Carr Rock, the lower part of which is a circular building, of masonry, measuring 18 feet in diameter, which forms a basement for six pillars of cast iron, terminating in a ball, 3 feet in diameter, which is elevated about 25 feet above the medium level of the sea; the whole at half-tide appearing somewhat like a vessel under sail at the distance of 2 or 3 leagues. A buoy has also been placed to the eastward of the beacon. Mariners are warned, when they run for the Carr Rock beacon, to do so with caution, both on account of its exposure to the breach of the sea, and its liability to receive damage from vessels under sail.

DIRECTIONS FOR SAILING UP THE FRITH OF FORTH.

VESSELS coming from the North Sea for the Frith of Forth, in about the latitude of 56° 12′, which is nearly that of May Island lighthouse, will first perceive the high land about St. Abb's Head, which is lofty and regular; and the Cheviot Hills, which, in clear weather, may be seen 24 miles off, will also be easily recognized, by their appearing above all other hills to the southward of them. If making towards the coast of Fifeshire, the high Lomonds, Largo Law, Kelly Law, &c., will first appear, making unequal and detached heights, of conical forms, like the tops of sugar-loaves, long before the low land between them is visible.

If coming from the southward, you will probably see the round hill near Dunbar, making in appearance somewhat like the Bass Rock. Some navigators have mistaken it for that rock; but the North Berwick Law, seen to the northward of it, may always sufficiently distinguish it. If you intend going within the Bass, between it and the main, be careful to give the South Carrs a good berth. When you have passed these Carrs, keep at a moderate distance from the shore, and go either inside or outside of Craig Leith; if the former, keep close to it, and stand out between it and Lamb Isle. The depths are various, and the ground near the shore rocky. The mark to go between the Bass Rock and the shore is Fidra, between Craig Leith and Lamb Isle.

To sail up the Frith outside, and to the northward of the Bass, is more customary and safe. In this case you will steer from St. Abb's Head nearly N.W. by N., until you have passed the Bass, then W.N.W. to Inch Keith. The course to Inch Keith, from midway between the Bass and May Island, is W. by N., and from the south end of May Island W. $\frac{1}{4}$ N., about $21\frac{1}{2}$ miles. To sail from St. Abb's Head to the Bass Rock, keep the East Lomond on with the rock. In the night, keep without the stream 20 fathoms.

Midway between May Island and Fife Ness, the course to Inch Keith will be W. $\frac{1}{2}$ S.; but if close in with the latter, steer W.S.W. $\frac{1}{2}$ W., 9 miles, or to abreast of Elie Ness, and from thence west, towards Inch Keith.

If ships turning to windward in the mouth of the Frith, take the first of flood close

to the south shore, and keep the last of it on the north, they will have 7 hours' tide in their favour; for the stream continues to run south of Fife Ness ½ an hour after it changes on the north side of May Island, and an hour after it has done flowing at the Bass.

In the night, when standing over to either shore, below Fidra and Elie Ness, approach no nearer than 20 or 18 fathoms; between Fidra and Gullan Ness, no nearer than 14 or 12 fathoms; but west of Gullan Ness, you may stand into Aberlady Bay, to 8 or 7 fathoms.

In every part of Aberlady Bay the ground is clean and good. The usual marks for the roadstead are, Gullan Ness E. by S., and Portseaton S.S.W., or S.W. by S.; and there is generally good anchorage on the south side of the Frith, in all parts, between Gullan Ness and Inch Keith, where there is a less depth than 8 fathoms, observing to avoid Craigwaugh and North Craig. There is also good anchorage in Largo Bay (the N.E. side excepted), with gravelly ground, in from 14 to 7 fathoms. The common marks are, Elie Ness E. by S., and Methel pier, N.N.W., in about 12 fathoms. With westerly winds, vessels may anchor off the east side of Inch Keith, in from 7 to 12 fathoms, soft ground.

LEITH ROADS.—The MARKS for ANCHORAGE in the roads are, Barnbug Hall open to the northward of Cramond Island; and Edinburgh Castle a ship's length west of Newhaven, in 5 fathoms, muddy ground. Large ships should keep Barnbug Hall a ship's length open to the north of Cramond Island, for the deepest water lies in that direction.

CHANNELS TO THE SOUTHWARD OF INCH KEITH.—The channels to Leith Roads southward of Inch Keith, are also very good: the ground being generally soft, and the tide easy.

The black buoy on the Herwit, the pyramidal buoy on the North Craig, and the red buoy on the Craigwaugh, will be sufficient to point them out by day; and by night they must be avoided. The channel is nearly a mile wide. A leading-mark for sailing up the south channel, between the North Craig and Craigwaugh, is the highest part of North Berwick Law on with Rundel's summer-house, near Gullan Ness, bearing E.S.E. ½ E. Keep these on, until Inch Garvy comes on Hound Point; then steer on in that direction, until Largo Law comes open of the N.W. point of Inch Keith, and you will be in the roads.

In sailing up the Frith, southward of the Craigwaugh Rock, stand into Aberlady Bay, until North Berwick Law comes on with the high land within Gullan Ness, taking care, at the same time, to keep the Law open to the northward of the notch on the south end of the high land. Continue with this mark on, until Inch Keith light bears N. by W.; then bring Barnbug Hall just touching the north point of Cramond Island, and it will lead into Leith Roads.

In turning, when within the North Craig, you may stand to the Herwit, until the westernmost glass-house at Leith comes nearly on with Edinburgh Castle; and to the Craigwaugh, until North Berwick Law comes within its own breadth of the notch before mentioned; and to the beacon rocks and Leith Craigs, until a remarkable notch in the land over Inverkeithing comes apparently near Mickry Island.

Should night come on when you have advanced to the North Craig, and are between the Herwit and Craigwaugh, you may, in fair weather, continue your course, by means of the light on Inch Keith. With the light N. ½ W., you will be within these shoals, and may thence, with the lead going steer W.N.W., until the light bears N.E. ½ E., when you will be the length of the roads.

FROM FIFE NESS TO DUNDEE, ETC.

Description of the Land, &c.

FROM the N.E. end of the Carr Rocks, the course and distance to Babert Ness are N.W. by N., 4 miles; to the fairway buoy at the entrance of the River Tay, N. ½ E., 8½ miles; to Aberbrothick N.N.E., 15 miles; to Red Head N.E. by N., 19 miles; and to the Bell Rock N.E. by E. ¾ E., 10 miles.

INCH CAPE, or BELL ROCK, lies in latitude 56° 26′ north, and longitude 2° 23′ west. This was formerly considered the most dangerous and fatal rock off the eastern coast of Scotland,

It is in length $\frac{1}{2}$ a mile, and breadth 110 yards, being bold and steep-to, except to the south-westward, where a *rocky reef* runs off. On the west, or inner-side, close to the rock, are 4 fathoms water, and a little farther to the westward, 6 fathoms; close to the east, or outer side, are 7 fathoms; at a cable's length off, 16 fathoms; and $\frac{1}{2}$ a mile to the eastward, 23 fathoms. Its N.E. end is irregular and uneven, and the top of the rocks are generally from 4 to 8 feet above low water mark; but at high water, the spring-tides, which here rise 20 feet, will cover it. A stone lighthouse is erected upon it, which will render it no longer such an object of apprehension. This light is about 115 feet above low water, spring-tides. To distinguish it from others on the coast, it is made to revolve horizontally, and to exhibit from all points of the compass a bright light, and a light of a red colour, alternately; both showing themselves in the space of 2 minutes; so that in each revolution of 2 minutes, there will be seen a brilliant light, appearing at a distance like a star of the first magnitude, which, after attaining its full strength, is gradually eclipsed, and after a short interval of darkness, is succeeded by a light of a red colour, which in like manner increases to full strength, diminishes, and disappears. The coloured light, being less powerful, may not be seen when the bright one is first noticed; but the periodical revolution of the bright light will be sufficiently distinguishable. In thick foggy weather a bell is tolled, by machinery, night and day, at intervals of $\frac{1}{2}$ a minute. From the light, the course and distance to the North Carr Rocks are S.W. by W. $\frac{1}{2}$ W., 10 miles; to Red Head N. $\frac{3}{4}$ E., nearly 11 miles; to the fairway buoy of the Tay N.W. by W. $\frac{1}{4}$ W., 9 miles; to May Island light S.W. $\frac{1}{4}$ W., 16 miles; and to Dunbar S.W. by S., 26 miles.

ST. ANDREW'S BAY.—From Babert Ness the coast bends N.W., forming one side of St. Andrew's Bay. It is steep-to and rocky, and has 5 fathoms close along shore. The northern side of the bay is lined with a *long sandy flat*, which stretches to the bar of Tay. St. Andrew's Bay is safe and clean, with anchorage in from 7 to 9 fathoms. St. Andrew's Harbour is dry at low water, and sheltered by a pier, forming a safe retreat for small vessels. Its entrance is but narrow, and lies on the south side of the pier-head. In entering, run a little southward, bringing the pier nearly end on; then steer along its south side into the harbour. There are from 12 to 14 feet in it on spring-tides at high water, and 9 or 10 feet at neaps.

ST. ANDREW'S LIGHT.—The lantern of this light has been erected in the turret of the Cathedral wall of the city, first lighted February 12th, 1849. The light bears from the Bell Rock W. $\frac{1}{2}$ S.; Babert Ness N.W. by W.; and Buddon Ness high light S.W. by W. This light is fixed 100 feet above the level of high water, and visible 5 miles. There are also two fixed harbour lights on the pier-head, shown all night, bearing N.W. and S.E. of each other, and visible 6 miles; these lights in one lead towards the harbour.

About 2 miles to the northward of St. Andrew's is the entrance to the Eden River; the bar of which frequently shifts, and the channel in is crooked, intricate, and varying, consequently dangerous. N. by E. $\frac{1}{2}$ E., 6 miles from St. Andrew's, is Tentsmoor Ness, the western point of the River Tay.

The RIVER TAY.—The entrance to the River Tay lies $5\frac{1}{2}$ miles to the E.S.E. of Tentsmoor Ness, having a *sand bank* on each side; that on the north side is called the *Gaa*, extending $2\frac{1}{2}$ miles from Buddon Ness, and partly dries. The sand on the south side is called the *Abertay;* it stretches off, parallel to the Gaa, $5\frac{1}{2}$ miles from Tentsmoor Ness, and has a large black buoy, in $4\frac{1}{2}$ fathoms, near its extremity, called the fairway buoy. These sands are flat on the outside, but on their insides steep. The passage between the two sands is about half a mile wide. There is a *bar* lying athwart it, having from $3\frac{1}{2}$ to 4 fathoms over it. In gales of wind the sea breaks quite across the bar. When you are coming in from sea, the depth of water shoals gradually to 8 fathoms; but when you are over the bar, you will have 6, and soon afterwards 7 and 8 fathoms.

There are two lighthouses situated upon the northern shore at Buddon Ness; these have bright fixed lights on separate towers, the one higher than the other, and appearing like stars of the first magnitude, at the distance of 3 or 4 leagues. The height of these lights are respectively 70 and 50 feet, and the lanterns 85 and 65 feet above high water; and when in a line, bear from each other N.N.W. and S.S.E. They are leading-lights, intended to direct you to the fairway buoy at the entrance.

BUDDON NESS is also rendered remarkable by its red sandy downs, which are the only ones of the kind on this part of Scotland, south of Aberdeen. The *Horseshoe* is a *ridge of stones*, stretching $\frac{2}{3}$ across the Frith from Broughty Castle, to a mile below it, having from 6 to 9 feet over it at low water. The *Larrick* is a *bank* opposite to the Horseshoe, and runs from Tentsmoor Point to Parton Craig, drying at low water, although near its edge are 5 and 4 fathoms. Near the outer edge of this bank is a small island, called the Scalp, with a hut upon it. From the bar to Dundee, the distance is 11 miles; the latter bearing from the former about N.W. by W. Besides Buddon Ness lights, there are lights shown at Buddon Harbour, Port on Craig, Newport, and Dundee; but these are for the use of the river navigation.

The following buoys have been placed in the Frith of Tay, to point out the fairway channel, viz.:—Three red buoys, called the elbow buoys, marked Nos. I., II., III. In December, 1845, three additional red buoys were placed on the northern edge of the Abertay sand, in continuation of the former red buoys on the elbow, and marked Nos. IV., V., and VI. They commence about $1\frac{1}{8}$ mile W.N.W. of No. III. buoy, and are laid $1\frac{1}{8}$ mile apart. All the red buoys (Nos. I,

to VI.) must be left on the port, or south side of the river, when going in; and the four chequered buoys, called the Gaa buoys, on the starboard side. The inner buoy on the Gaa will be distinguished from the other three by being chequered black-and-white, with a black top, and the outermost, or seaward buoy, by having a staff and ball at the top. A black buoy, marked L, and named the Lady buoy, placed about $1\frac{1}{2}$ mile above Buddon Ness; and the Horseshoe buoy (black), marked H; both these are to be left on the starboard side. In the fairway channel, when over the bar, you will have from 5 to 6 or 8 fathoms, so far as Buddon Ness; and when the ferry lights are in one, leading to the southward of the Horseshoe, 5, 6, 4, to $3\frac{1}{2}$ fathoms; between the Horseshoe and Broughty Castle, the depth increases to 9, 10, and 11 fathoms; and from thence to Dundee are 5, 4, and 3 fathoms.

DIRECTIONS FOR SAILING TO THE RIVER TAY, ETC.

VESSELS bound for the River Tay, may go on either side of the Bell Rock with safety; for the lighthouse will be a sufficient guide by day, and the light by night, to direct them. Bring the Bass Rock open to the eastward of May Island, bearing S.W. by W., or May Island in that bearing, and you will pass to the southward and eastward of the Bell Rock. Bass Rock open of May Island, bearing S.W., will lead clear to the northward and westward of it; but the light itself will best direct your course.

If coming from the Frith of Forth, and bound to the Tay, after rounding the North Carr Rocks, a N. $\frac{1}{2}$ E. course will take you to the bar, in from 12 to 14 fathoms.

In thick weather, or in the night, steering in 18 fathoms, will lead down the Frith close to Fife shore, and round clear of the North Carr into St. Andrew's Bay. If, in crossing the bay, the water should shoal, you may, when Buddon Ness lights bear W. by N., stand out again to 16 or 18 fathoms. Keeping in the latter depth will lead to a clear berth, without Red Head.

But in turning to windward across St. Andrew's Bay, stand no nearer to the North Carr than 20 or 18 fathoms; from the Carr to Babert Ness, into 12; from Babert Ness to Tay Bar, into 10; from Tay Bar to Aberbrothick, into 13; and from thence to Red Head into 15 and 16 fathoms. You may stand off to the Bell Rock to 19 fathoms; and in that depth, to the southward or northward of this rock, you will be in the line between it and Fife Ness, or between it and Red Head.

When clear of and round the Carr, you may, if bound to St. Andrew's, steer along the south shore, going no nearer to it than 9 fathoms, till abreast of the town, and there anchor, about a mile from shore, in from 7 to 4 fathoms, sandy ground. If bound into the harbour, run a little to the southward, until the pier is nearly end on; then steer for the south side of the pier-head, keeping close along it into the harbour.

With easterly winds, ships in St. Andrew's Bay must allow for the flood-tide, which sets strongly to the westward on the north side, and slowly to the eastward on the south side; therefore, during flood, they should make short boards close to the south shore, until the ebb makes, then, stretching over to the northward, the tide will carry them out.

When bound for the River Tay, after you have rounded the North Carr, steer so as to shut May Isle in behind Fife Ness; then continue with it just shut in, and bring Buddon Ness to bear N.N.W. $\frac{1}{4}$ W., steering with it so, until the two lighthouses can be seen. Bring them on with each other, bearing N.N.W. $\frac{1}{4}$ W.; then run in with them in this direction, which will carry you safely over the bar, close to the fairway buoy, and into the proper channel, until the ferry lights are in one; this mark will lead you through the best water, in 6, 3, 7, and 5 fathoms, to the southward of the Horse buoy; when past this buoy, steer towards Broughty Castle, and thence mid-channel, to the anchorage at Dundee. The Frith has been lately, as before observed, regularly buoyed, which will much facilitate its navigation.

Be careful never to take the bar on a spring-ebb, if possible to avoid doing so, for the tide is very strong, and will require a powerful wind to stem it.

In a large ship you may anchor in the ferry road, off the westernmost houses on the north shore, above Broughty Castle, with the high lighthouse at Buddon Ness on with the castle, in 6 or 7 fathoms water; or to the eastward of the Newcome Shoal,

which dries at low tide, near the south shore. All the ground in the river is sand or gravel.

As the water breaks from side to side of the entrance in bad weather, especially when the tide runs against the wind, strangers, going in at such times, will be liable to danger. Such should, if possible, wait until the flood-tide is well made. If obliged to attempt the bar with an ebb-tide and easterly wind, carry very little after-sail, that the ship may the more readily answer her helm, when the tide, by taking her upon either bow, shall render such celerity necessary.

Off Red Head the tide runs very strongly, and often causes a rough sea, especially when the stream sets to windward. In the night-time, or in hazy weather, come no nearer to this part of the coast than the depth of 26 fathoms. There are 20 fathoms within $1\frac{1}{2}$ mile of the shore.

FROM THE RIVER TAY TO BUCHAN NESS.

Description of the Land, &c.

FROM Tay bar the coast extends N.E. by E., 11 miles, to Red Head. The town of Westhaven lies about 3 miles N.E. from Buddon Ness; between them is a sort of sandy bay, shoaling in a curve from the Gaa. Easthaven is $1\frac{1}{2}$ mile farther; the shore here is rocky $\frac{1}{2}$ a mile off. Both West and Easthaven are fishing-towns.

The *Carr's End*, or *Elliot's Horses*, is a *reef of rocks*, between Easthaven and Aberbrothick; they stretch out a considerable way from the shore, and must have a berth in passing.

ABERBROTHICK, or ARBROATH, is 7 miles from the bar of the Tay, from which it bears N.E. $\frac{1}{2}$ N.: here is a dry but safe harbour. A small fixed light, of red colour, is shown on the northern pier-head, on the starboard side in entering the harbour; it is lighted by the pilots only when vessels are in the bay, in order to show the proper time of the tide for them to enter, and is commonly visible 8 miles, when the weather is clear. The roadstead lies nearly a mile off the town, and has from 9 to 10 fathoms water. Between Buddon Ness and Aberbrothick, you may run along, in 10 fathoms with safety, a small distance off shore. The land from the Carr's End to beyond Aberbrothick is low, flat, and rocky, 2 cables' length off. Aberbrothick has a remarkable old abbey, standing near the west end of the town; from hence to Red Head is $4\frac{1}{2}$ miles; the shore between is high, rugged, and steep, with 14 fathoms at a mile distant. In this place stands the small fishing-town of Auchmuthie.

To the eastward of Red Head you will open Lunan Bay, which is about 2 miles broad. Here is good anchorage, in from 6 to 8 fathoms, with off-shore winds, Red Head bearing S. by W. or S.S.W. The south side of the bay is low and rocky, having also some *rocks*, above water, at a little distance from the beach. The bottom forms a steep bank; near which, on a little hill, stands the ruins of Red Castle. The north side is a high steep bank; at the end of which are Boddin limekilns, off which lies a *rock*, named *Boddin Rock*. At $1\frac{1}{3}$ mile to the eastward is Chapel Ness, off which lies the *Craig Rock*, visible at low water, spring-tides; and N.E. by N., a mile farther, is the south-western point of the entrance to Montrose.

MONTROSE.—N.E., 5 miles from Red Head, on the S.W. point of the South Esk River, called Montrose, on Scurdy Ness, is a battery; directly off which is the *Scurdy Stone*, a *flat rock*, running out about $\frac{1}{4}$ of a mile, its outer part drying at low ebbs. There is also *another large rock*, called the *In Stone*, lying close to the Ness, and appearing at half-ebb. You will avoid them, by not going nearer to the Ness than 6 fathoms water. To the north-eastward of the entrance to the river, is Montrose Road; where the best mark for anchoring is, the town spire-steeple, on with Turin hill, bearing W. by N. or W.N.W., in 9, 8, or 7 fathoms. With this mark, you will have clean sandy ground; but more to the southward you will find it foul; while to the northward vessels may anchor, from $\frac{1}{2}$ a mile to a mile off shore, so far as the mouth of North Esk River, on clean sandy ground.

The town of Montrose lies on the north side of the river, about $1\frac{1}{2}$ mile from the Ness, the entrance to the harbour being between the Stones and the Annat. The *Annat* is a *bank* which stretches out from the N.E. point of the river. The channel in is about the length of 3 ships wide; but farther in it widens. On the bar there are 13 to 18 feet at low water; but the depth decreases as you advance towards Ferryden to 9, 8, and 7 feet, but on the south side of the river, opposite Ferryden, are 14 to 16 feet at low water.

The harbour of Montrose has been much improved of late. The piers have been lengthened, and two lighthouses erected on the north-eastern side of the river. A floating-beacon is also placed on the outer extremity of the Annat Sand, and a beacon erected on Montrose Ness; so

that vessels may now reach the quays with neap-tides in safety. The high light tower is 60 feet above the level of the sea, and the lower one 35 feet. Both are painted white; and, when in a line, bearing about N.W. by W. $\frac{1}{4}$ W., serve for an excellent mark to take the harbour, by day as well as by night; for as there are 13 feet water on the bar at low water, vessels may safely run in at any time of the tide, in an easterly storm, and anchor in the Stell, about $\frac{3}{4}$ of a mile up. The lights exhibited from these towers are of a *red* colour, by which they will readily be distinguished from all others on this coast, and are visible 10 or 11 miles off. Three buoys are placed on the edge of the sand, on the north side of the entrance.

Opposite to the town is an island, called the Inch; and to the westward appear three hills, called the Horses, each being steep on its south side. The Muscle Scalp, over which the tide sets strongly, extends $\frac{2}{3}$ of the way from the N.E. side of the Inch, towards the shore, and is covered at half-flood. High water, full and change, 1h. 36m. Springs rise 13 feet, neaps 8.

Montrose is a place of much trade; but the rapidity of the tides, the narrowness of the channel, and the Annat and Stones (the former extending a mile from the north shore into the sea), rendered it, formerly, extremely dangerous for a stranger to attempt the harbour without a pilot; but the recent improvements have greatly facilitated its navigation.

At $3\frac{1}{2}$ miles N.E. from the South Esk, is the entrance to the North Esk, the land between being a low and sandy beach; and the anchorage off-shore good, gradually deepening, as you recede from the land, to 10 and 12 fathoms, which latter depth is about $1\frac{1}{2}$ mile off. John's Haven is about $3\frac{1}{4}$ miles farther; and 3 miles beyond that is Gurdon; these are two little creeks among the rocks, where small vessels resort. The coast, from John's Haven to Gurdon, is *rocky;* and behind, inland, is a remarkable high hill, called Craig Davie. Inver Bervie is situated between Gurdon and Tod Head; and is rendered remarkable by two hills, over the town, separated from each other by a deep valley: these are the above-mentioned Craig Davie and Bervie Brow. From Inver Bervie to Tod Head the coast is all *rocky*, but steep-to, having 6, 7, and 8 fathoms close in.

TOD HEAD lies nearly $4\frac{1}{2}$ leagues N.E. by E. from the bar of Montrose, and 6 leagues from Red Head, in a similar direction. It is low, and therefore not easily perceived, the high hill of Craig Davie being frequently mistaken for it.

STONEHAVEN.—About $4\frac{1}{2}$ miles N.E. from Tod Head, lies the pier-harbour of Stonehaven, in which are 13 or 14 feet at high water, spring-tides; and with neap tides 7 or 8 feet. Easterly and S.E. winds cause a great swell in the harbour. It dries at low water; so do the rocks on which the pier is erected, for a full cable's length out beyond the pier. Two lights (fixed) are placed on the pier, 18 and 24 feet above high water; the seaward, or lower light, bright; the landward, or upper light, red; their relative position W. by N. $\frac{1}{4}$ N., and E. by S. $\frac{1}{4}$ S. To sail into this place, run in close along the rocky shore, on the south side of the bay, until you are within a cable's length of the pier-head; then steer directly for the entrance between the piers into the harbour. The north point of the bay has *several rocks* about it, called the *Carron Rocks*. It is high water at Stonehaven, full and change, at 1h. 17m. Spring-tides rise 14 feet, neaps 8 feet.

From Stonehaven the land runs N.E. by E., $7\frac{1}{2}$ miles, to Findon Ness; a little before you come to which, is Port Lethen. From Findon Ness to Greg Ness, the course is N.E., about 4 miles. From Greg Ness the shore bends northward to Girdle Ness, forming a small place, called Nigg Bay. Between them from Stonehaven to Greg Ness, the shore is all *rocky* and steep-to, having 12 to 15 fathoms close in. A *patch of rocks*, called the *Craig Maren*, lies $6\frac{1}{2}$ miles north-eastward of Stonehaven, extending $\frac{1}{2}$ of a mile from the shore: and 3 miles north-eastward of the latter, lies the *Cove Rock*, at $\frac{1}{4}$ of a mile from the land; and a mile farther northward, are the *Rasmans*, a *small patch*, lying nearly the same distance from the shore.

ABERDEEN.—Girdle Ness is the south point of Aberdeen Bay. Off the Ness, at a little distance, lies a *small rocky shoal*, called the *Girdle*, appearing only at low-springs. Findon Ness open of Greg Ness clears it to the eastward; and the pier-head light open of Short Ness, leads to the northward of it.

On Girdle Ness a lighthouse is erected. It is a double light, exhibiting two fixed lights, one over the other, like stars of the first magnitude; but to a distant observer, the lights appear as one, having an elongated form. These two lights are elevated respectively 115 and 185 feet above the medium level of the sea, and may be seen at the distance of 19 and 16 miles, and the intermediate distances according to the state of the weather.

The lighthouse is situated in latitude 57° 8′ north, and in longitude 2° 3′ west, bearing from the north pier of Aberdeen S. by W., distant 1,220 yards; from Buchan Ness lighthouse S.W. $\frac{1}{2}$ W., distant 22 miles; and from the Bell Rock lighthouse N.E. $\frac{1}{4}$ N., distant 44 miles. The two lanterns at this station are open, or glazed, from N.N.E. to W.S.W. $\frac{1}{2}$ W., and intermediate points, easterly and southerly.

Two leading-lights have been established, for the safe guidance of vessels entering this port. These lights have no reference whatever to the state of the tides, as they are exhibited from sunset to sunrise. But on other occasions, when (on account of the speats, or floods in the River Dee, or from too much sea on the bar) it is, in the opinion of the captain-pilot, considered unsafe for vessels to attempt entering the port, the lights will be changed from *red* to *green*, during the continuance of such danger, when ships cannot enter. The lights are of a brilliant

red colour, visible, in clear weather, at the distance of 3 miles, one above the other, and are elevated, the one about 30 feet, and the other 47 feet respectively above high water of spring-tides. These lights, when first distinctly visible in coming from the northward, bear W.S.W.; and in coming from the southward, due west; and when seen in a line, W. $\frac{3}{4}$ S., nearly; and if the depth of water permits, vessels may run for the harbour with safety.

On the north pier-head at Aberdeen is a fixed light, shown from half-flood till high water, and visible 8 miles.

Aberdeen Harbour lies close in with the north side of Girdle Ness, having a long pier, with a flagstaff upon it; also another pier, built along the southern shore. Nearly $\frac{1}{2}$ a cable's length from the outer end of the south pier is a beacon, fixed on a *rocky reef*, which stretches out from the south shore; and $\frac{1}{2}$ a cable's length east from the beacon is *another reef*, called *Short Ness*, lying also from the south shore about the same distance. From hence a *bar* runs across the harbour's mouth, to within a little more than $\frac{1}{2}$ a cable's length outside the outer end of the north pier-head, having but 2 feet at low water, and 4 feet when you get within the piers. The marks for the bar are, the north side of the south pier in sight; and Old Aberdeen Church (which has two pointed steeples), on with the east side of the Broad Hill. The course in is W.S.W. $\frac{1}{2}$ W., the channel being near to the south pier and close along the jetty, running from the north pier inner end. Over the bar, at high water, there are 12 feet neaps, and 16 feet spring-tides. When there is sufficient water over the bar, a flag is hoisted in day-time on the north pier-head, and a light is placed there at night for the same purpose; but those unacquainted with the place should always take a pilot, for the sands shift, and the entrance is difficult. It is high water, full and change, at 1h. 10m.; springs rise 14 feet, neaps 8 or 9.

Aberdeen Road lies just round to the northward of Girdle Ness. There is good riding in it with off-shore winds, the Ness bearing S. by W. or S.S.W.; and the two steeples of Aberdeen in one, in 7, 8, and 9 fathoms.

NEWBURGH is a small but safe harbour, lying N.E. $\frac{1}{4}$ N. from Aberdeen, distant $10\frac{3}{4}$ miles. Over the bar are 12 and 13 feet with spring, and 8 or 10 with neap-tides; but the bar frequently alters, and therefore should not be attempted without a pilot. The shore, from Aberdeen to the Black Dog, is moderately steep; but from thence to Newburgh it is flat and sandy. The soundings are gradual—from 7 fathoms near the shore, to 18 and 20 fathoms 3 miles off.

A New Land-mark.—The Church of St. James, Cruden, formerly a plain building, and long regarded by mariners as a land-mark, has been lately re-built, with the addition of a tower and a spire, nearly 100 feet high. The Church is situated on a hill, 200 feet above the level of the sea, and about 18 miles north from the port of Aberdeen.

COLLIESTOWN is 3 miles from Newburgh, and principally occupied by fishermen. Between Aberdeen and Newburgh are some small sand-hills. A little eastward of this the shore becomes *rocky*, and continues so to Cruden Scars, a distance of about 5 miles, east. The *Scars* are a *cluster of rocks*, partly above water, running $\frac{1}{2}$ a mile out; close to them are 12 fathoms; and to the north-eastward is a sandy bay, having a small town at the bottom; eastward of which is Slain's Castle. Off the town is a *sunken rock*, called the *Buss*, lying about a cable's length from the shore. At 4 miles hence is Buchan Ness, the coast between being high rugged cliffs, steep-to, having 12 and 14 fathoms close in, and increasing to 30 at a little distance. There is a round hill, with a heap of stones at the top, called Stirling Hill, which is frequently mistaken for Buchan Ness.

From Girdle Ness, the course and distance to Buchan Ness are N.E. $\frac{1}{2}$ E., 22 miles; and from Buchan Ness to Tod Head S.W. $\frac{1}{2}$ W., 38 miles; to Fife Ness S.W., westerly, 77 miles; and to St. Abb's Head S.W. by S., 96 miles.

DIRECTIONS FOR SAILING BETWEEN THE RIVER TAY AND BUCHAN NESS.

From Buddon Ness to Arbroath the bearing and distance are E.N.E., 8 miles; from Arbroath to Red Head, N.E. by E., 5 miles; from the fairway buoy of the River Tay to Red Head N.E. $\frac{3}{4}$ E., 12 miles; and from the Bell Rock to Red Head N. by E., 12 miles.

From Red Head to Tod Head, the course and distance are N.E. by E., $18\frac{1}{2}$ miles. Vessels sailing between them, in the night, should not come into less water than 30 fathoms; and running along shore, should be careful to give a good berth to the Craig Rocks, keeping the Red Head outside of Chapel Ness, to avoid the Stones and Annat Banks, at the entrance of Montrose.

To run into **Montrose,** you must have plenty of sail. The marks for entering are, the two lighthouses in one, bearing N.W. by W. ¼ W. When in, near the point, edge to the northward, to avoid the In Stone. Steer up mid-channel to Ferryden, when you may anchor; or from Ferryden to the northward, if bound up to the town, keep the starboard shore aboard all the way up to the quay, in order to avoid the Muscle Scalp, which lies off the N.E. side of the Inch, covered at half-flood, and over which the tide sets strongly.

MONTROSE ROAD lies a little to the northward of the harbour's mouth; and the common anchoring place is a mile from the shore, with the steeple of Montrose, on Turin Hill, bearing W. by N. or W.N.W., in from 7 to 9 fathoms, on sandy ground. More to the southward the ground is *foul;* but to the northward there is anchorage, from ½ a mile to a mile off shore, as far as the mouth of the North Esk River, on clean sandy ground.

Between Tod Head and Girdle Ness, in the night, stand into no less depth than 35 or 32 fathoms.

STONEHAVEN.—To sail into Stonehaven, run close along the rocky shore, on the south side of the bay, until within a cable's length of the pier-head. Then steer directly for the latter, so as to go round its south end into the harbour.

ABERDEEN.—To sail into Aberdeen Harbour from the southward, with south or S.W. winds, when it becomes necessary to keep the south shore on board, keep Findon Ness open of Greg Ness, until the pier-head comes in sight, in order to avoid the Girdle Rock. By night you will be clear of it so soon as the pier-head light comes in sight; but the lights at Girdle Ness will be your best guide. When near Short Ness, steer so as to open the northernmost whale-fisher's boiling-house outside of the north-pier head; and keep it so, until the north side of the south pier begins to appear in sight; then haul up into the harbour. This mark carries you over the south end of the bar, where there is, perhaps, a foot or two less water than in the middle of it. To sail over the bar in the deepest water, steer in with the harbour fairly open; and when Old Aberdeen Church steeples are shutting in behind the east end of the broad hill, you will be passing the bar. When in between the piers, keep rather nearer the south side, and pass close to the end of the low jetty which runs out from the inner end of the north pier; the pilots will then direct you where to lie.

ABERDEEN ROAD is to the northward of Girdle Ness. The marks for anchoring in it are, the two steeples of Aberdeen in one; and Girdle Ness bearing S. by W. or S.S.W., in from 7 to 9 fathoms water. Vessels ride very well here with off-shore winds.

Between Aberdeen and Newburgh, do not stand nearer to the shore than into the depth of 9 or 7 fathoms, especially a little to the southward of the latter, because of some *sandy ridges,* thrown up with gales of wind, a little distance from the shore. Newburgh is a safe harbour; but as the bar sometimes shifts, it should not be attempted without a pilot.

Between Newburgh and Buchan Ness the shore is all bold, but *rocky,* except Cruden Scars and the Buss, which are above water, and may be approached, by day, in 12 fathoms; but by night, into not less a depth than 34 fathoms.

TIDES FROM St. ABB'S HEAD TO BUCHAN NESS.

Mariners navigating this part of the coast should be particularly attentive to the flowing and setting of the tides, which are as follow:—

It is high water, full and change, at Dunbar, at 2 o'clock; in the Frith of Forth, at Leith, and the other pier-havens, at 22 minutes after 2h.; at Fife Ness, by the shore, at 2h.; St. Andrew's, at 2h.; Dundee, at a ¼ after 2h.; Tay Bay, at 2h.; Montrose, at 1h. 30m.; Stonehaven, at 1h. 17m.; Aberdeen Bar, at 1h. 10m.; Newburgh, at 1h.; and Buchan Ness, at 12h. 50m.

The perpendicular rise of tide, in feet, is nearly as follows:—Dunbar, springs 15, neaps 9; Frith of Forth and the pier-haven, springs 16, neaps 12; St. Andrew's, springs 15, neaps 10; Dundee and Tay Bar, springs 16, neaps 10; Montrose and

Stonehaven, springs 13, neaps 10; Aberdeen, springs 14, neaps 10; Newburgh to Buchan Ness, springs 13, and neaps 8 feet.

As the stream of tide in the offing sets to the southward with considerable strength, at a great distance from the shore, it follows, that the length of tide between the time of high water on shore and the time of high water in the offing, will be in proportion; and we find that the stream runs to the southward in the offing 3 hours after high water on shore. Gales of wind from between W.S.W. and N.W. raise the tides higher and cause the stream of flood to run somewhat longer in the offing. Easterly and S.E. winds have a contrary effect.

The velocity of tide is greatest against the projecting points, as at Buchan Ness, Fife Ness, St. Abb's Head, &c.; as also in passing over the fishing banks off the coast, upon which the stream runs longer than in other parts, after it changes on shore. In the bays which fall out of the course of the tide, on the contrary; as between Montrose and John's Haven, and Aberdeen and Slain's Castle, the current runs slowly, and turns sooner in proportion; but in the Frith, and other inlets, where the stream sets almost directly in, the current becomes stronger, according to the decrease of breadth or depth.

Off the mouth of the Frith and St. Andrew's Bay, the tide is affected in its course by the flood setting in, and drawing the latter part of the ebb and first of flood, which answer to the in-land flood, in shore; and the Frith's ebbs forcing the latter part of the flood and first of ebb from shore.

The stream off Buchan Ness is the strongest on this coast, and runs with a velocity of about 4 knots in springs, and $2\frac{1}{2}$ in neaps; and with neaps, the tide is sooner at its height, and does not run so long as with springs. At 6 miles off the Ness, the stream of flood runs till 3 o'clock; and at 12 miles off till 3h. 30m. Thence the tide continues on a southerly course, over the fishing-banks, towards the Staples, the stream ending 3 hours after high water on the adjacent shores. At 3 miles outside of the Staples, it runs until 4 o'clock; and at 12 miles until 5h. Continuing its course thence along the English coast, at 5 or 6 leagues from shore, it runs until about 3 hours after high water on shore, as above.

From St. Abb's Head the flood sets to the southward; but the last 3 hours of ebb sets along the coast of Dunbar, and makes the first of flood into the Frith. It begins to run up past the Bass at $\frac{1}{2}$ after 7h. and is high water there at 2h. 15m. The ebb then coming out, joins the last of the flood, going round the Head to the southward, and continuing nearly 3 hours, until the ebb makes outside; which, coming from the southward, meets the ebb from the Frith, off Fal's, or Fast Castle, with a noisy rippling, continuing until the Frith flood makes again.

The Frith flood upon the south shore, commences at Fast Castle, or between it and Dunbar, and sets to the westward (passing the Bass) half an hour sooner than on the north side of May Island, particularly with southerly and south-westerly winds, which accelerate it on that side.

Past the Bass, on full and change days, the flood runs up until 2h. 15m.; and on the north side of May Island till 2 o'clock. The stream here runs only from between $1\frac{1}{2}$ or 2 miles an hour, until between Inch Keith and Kinghorn Ness, where, on springs, it runs 3 miles. The stream in Leith Roads begins to run down, past the Beacon Rocks, nearly $\frac{1}{2}$ an hour before high water.

At 2 miles outside of Red Head the flood, on full and change days, runs until 3 o'clock, though it be high water on the shore at 1h. 30m. Round this head the flood sets into St. Andrew's Bay, until its last quarter, which sets south and S.S.E.

Westward of Red Head the flood sets W.S.W. along the shore, past Aberbrothick and the bar of the River Tay, towards St. Andrew's Bay, running until 2h.; and vessels passing Tay Bar, must be careful to allow for it, particularly in a calm, or with little wind, as it sets directly on the Abertay. The ebb, on the contrary, sets on the Gaa. From a little way within the Tay bar, the tide takes the course of the river to Dundee, where it runs until 2h. 30m.

From the Abertay, the tide sets strongly into the Edenmouth; but between St. Andrew's and Babert Ness, it is scarcely perceptible. From Babert Ness to Fife Ness, the flood sets moderately to the S.E.; but increases its velocity towards Fife Ness. Outside of the North Carr it becomes much stronger, and runs until 2h. 30m.

About the Bell Rock it is high water at 1h. 30m.; but continues to run outside until 4h. Within the Rock, and off St. Andrew's Bay the flood runs until 3

o'clock; the first part of it here, and off the Frith, setting in a direction for May Island; the middle to the south; and the last part S.E. The first part of the ebb sets from E.N.E. to N.E.; the middle N.N.E.; and the last part North and N.N.W.

The flood sets strongly into the harbour of Montrose; and the stream runs until nearly 3h., setting across the mouth of that harbour to the southward, over the Scurds Stone; and the ebb to the northward, over the Annat, which should be particularly remembered and attended to.

The flood also sets strongly into the harbour of Newburgh; but the current outside does not set at the rate of more than $1\frac{1}{2}$ mile an hour. Very little tide sets into the harbour of Aberdeen; and, with freshes, the stream always runs outward. The flood, past Girdle Ness, runs to the southward, until 2h. 30m. When strongest, it runs here at the rate of $2\frac{1}{2}$ miles; neaps $1\frac{1}{2}$; and the same, nearly, at Tod Head.

FROM BUCHAN NESS TO DUNCANSBY HEAD, INCLUDING THE FRITHS OF MORAY AND TAIN.

Description of the Land, &c.

BUCHAN NESS LIGHTHOUSE, on the peninsula piece of ground called Buchan Ness, is situated in latitude 57° 28′ north, and in longitude 1° 46′ west. From Rattry Briggs the light will be seen over the eastern part of the town of Peterhead, bearing S.S.W. $\frac{1}{4}$ W., distant 9 miles; from Cruden Scars N.E., distant 6 miles; and from Girdle Ness N.E. $\frac{3}{4}$ E., distant 25 miles. The lantern is open, or glazed, from N. by E. to S.W. by W., and intermediate points easterly.

This light having a somewhat novel appearance, from the quick revolution of its reflector-frame, will be known to mariners as a flashing, or twinkling light, which, in every 5 seconds of time, emerges from a state of partial darkness, to a transitory, or momentary light, resembling a star of the first magnitude. It will thereby be readily distinguished from the slow motion and red colour of the Bell Rock light, towards the south; or from the stationary light of Kinnaird's Head towards the north.

The light is elevated 130 feet above the medium level of the sea. In clear weather it will be seen at a distance of 16 miles, and intermediately, according to the state of the atmosphere.

The land about Buchan Ness is high, and visible at a great distance. Moor Mount is a remarkable mountain—it may be seen to the northward, southward, and eastward, appearing long, high, and like a saddle, hollowed in the middle: but when seen from the westward, it seems round. The Paps of Caithness, on the northern side of the Frith, are two high hills, with sugar-loaf tops, having some lower hills about them. These may be seen, in clear weather, from the south and S.E., 14 or 15 leagues. Noss and Duncansby Heads are, in appearance, so alike, that they have often been mistaken for each other. They are both high, steep, and rocky points of land; but Duncansby Head may be distinguished at a distance by a large rock, about a mile to the southward of the head, called John o'Groat's House, or Duncansby Castle, which may be perceived 5 leagues off.

PETERHEAD stands upon a low rocky point, about 2 miles N.N.E. $\frac{1}{4}$ E. from Buchan Ness, having a stone pier, serving to shelter the harbour from the east and S.E. winds. It dries at low water, and is only fit for small vessels. *Calk Skerry rocks* are above water, at the mouth of the bay, lying nearly N.E. by E., distant $\frac{1}{4}$ a mile from Buchan Ness. West from the Skerry is *another rock*, appearing at spring-ebbs: between are 12 fathoms. There are 9 fathoms in the bay within, and 12 fathoms between it and Peterhead. Here vessels may anchor, with off-shore winds. A *rocky reef* stretches $\frac{1}{2}$ a cable's length from the Skerry; and *rocks* lie $\frac{1}{2}$ a cable's length off all round it. Ships bound to the northward may, with N.W. winds, anchor to the southward of Calk Skerry, in 8 or 9 fathoms; but they must be careful to avoid being caught there with southerly winds. More than a league to the northward of Peterhead is *Scotstown Briggs*, a *patch of rocks*, extending $\frac{1}{2}$ a mile from the shore: and about N. by E., $8\frac{1}{2}$ miles from Buchan Ness, is Rattray Head, from which a *ledge of rocks*, called *Rattray Briggs*, runs off east, about $\frac{3}{4}$ of a mile. You will avoid these ledges, by not coming nearer to the shore than 13 fathoms; or by keeping Moor Mount, or Mormond Hill, in sight, above the land of Rattray Head. The old mill near Peterhead, in one with Stirling Peak, near Buchan Ness, bearing S.S.W., clears the Briggs, in $2\frac{1}{2}$ fathoms.

PETERHEAD NEW HARBOUR LIGHTS.—North Harbour.—The lighthouse is

erected on the west pier-head of the north harbour. This is a fixed light, of a red colour, and visible from S.W. $\frac{1}{4}$ S., round easterly, to W. $\frac{1}{2}$ S.

South Harbour.—On the west pier-head is a fixed bright light, visible from N.E. $\frac{1}{2}$ E., round southerly, to N.W. $\frac{1}{2}$ N.

RATTRAY HARD is a *bank* with 6 fathoms water on it, bearing E. by S., about $1\frac{1}{2}$ mile from Rattray Head. It extends north and south about $\frac{1}{2}$ a mile. The western spire of Peterhead, in one with the peak, bearing S.S.W. $\frac{3}{4}$ W., clears the Hard to the eastward in 12 fathoms.

At 5 miles N. by W. from Rattray Head is the little fishing-town of Cairnbulg; from off which lie the *Cairnbulg Scars*, a *reef of rocks*, nearly dry at low water, and stretching out about $\frac{1}{3}$ of a mile. They are steep-to, having 5 or 6 fathoms close to them. Keep Troop Head outside of Kinnaird's Head, and you will go clear of them.

At $1\frac{1}{2}$ mile E. by N. from Cairnbulg Point lies *Steratan Rock*, with 5 fathoms on it. The marks for it are, Invarallochy Castle, in one with White Link House, bearing S.W. $\frac{1}{4}$ W. It has from 9 to 15 fathoms close to it.

COLONEL ROCK lies a mile E. by S. $\frac{1}{2}$ S. from Kinnaird's Head, and has $5\frac{1}{2}$ fathoms upon it, with 14 fathoms close to it. About $\frac{3}{4}$ of a mile E.N.E. from Rosehearty Head is a *small patch*, of $5\frac{1}{2}$ fathoms, with 20 fathoms close to it on the north side, and 11 fathoms to the southward.

KINNAIRD'S HEAD, in latitude 57° 42′ north, and longitude 2° 0′ west, lies N.W. $\frac{1}{4}$ W. from Cairnbulg, full 2 miles; and is remarkable for its castle, and a stone lighthouse upon it, 57 feet in height, which shows a fixed light, 120 feet above high water at spring-tides; and in fair weather may be seen 5 leagues off, from all points between W.N.W., seaward, to S.S.E. $\frac{3}{4}$ E. On the east side of the head is the tide-haven of Fraserburg, having a sandy kind of bay between it and Cairnbulg.

FRASERBURGH is a pier-harbour, having *patches of rocks*, lying both north and south of the piers; the outermost, called the *Outer Bass*, dries at low water springs; the northern rocks cover at half-flood. The leading-mark in from the eastward is, the Church spire in one with the north pier-head, N.W. $\frac{2}{3}$ N.; this leads in the deepest part, carrying 9 feet at low water, close to the piers. When working in to avoid the southern rocks, you must not shut in the houses at the north part of the town, with the angle of the north pier. Spring-tides rise 11 feet, neaps 6; high water, full and change, at 0h. 40m.

Two fixed lights are exhibited on the pier-head at Fraserburgh all night, (except in moonlight nights) from july to April.

From Kinnaird's Head, the course and distance to Duncansby Head are N. $\frac{1}{2}$ W., 69 miles. From Kinnaird's Head, the coast takes a W.N.W. $\frac{1}{2}$ N. direction, to Troup Head, Knock Head, and Portsoy.

Troup Head is a remarkable promontory, formed of lofty and steep cliffs, having a *reef* extending from it, with a *rock*, above water, at the end of it. It is distant from Kinnaird's Head 9 miles. The shore between them is steep-to.

On the east side of a point, nearly half-way between Kinnaird's and Troup Head, is the small town of Rosehearty: west of which is Aberdour Bay. Having passed Troup Head, you will see the small tide-haven of Gardenstown.

BANFF lies $7\frac{1}{2}$ miles W.N.W. $\frac{1}{2}$ W. from Troup Head, and is also a tide-haven; on the eastern side of which is the *Collie Rock*, drying at half-tide, and having a narrow channel between it and the shore. The toll-house W. $\frac{1}{2}$ N., open north of the gas-chimney, clears the Collie Rock to the northward; and the toll-house in one with the coast-guard flagstaff leads through to the southward of the Collie Rock. On Brea Head, on the east side of the entrance to Banff, is a fixed red light, elevated 80 feet, and visible 12 miles.

Macduff lies about $\frac{3}{4}$ of a mile to the eastward of Banff, and is also a tide-haven. A red fixed light is shown on the pier-head, elevated 25 feet, and visible 6 miles.

At 5 miles beyond Banff, is Portsoy, another small tide-haven, to the westward of which, and lying a little off-shore, are the *Scate Rocks*. These are dangerous, and should have a good berth, for several ships have been wrecked upon them. Boyne and Cowhyth Heads are also *rocky*. About 5 miles N.W. by W. $\frac{1}{2}$ W. from Scate Rocks, is a *rocky reef*, called *Scar Nose*. This is about 18 miles from Troup, and 27 miles from Kinnaird's Head. At 2 miles S.E. from Scar Nose is Logie Head, and between them is Cullen town and bay. Within the latter is a *small reef*, called the *Caple Rocks;* a little more than half-way between the town and Scar Nose, lies another *small rock*, but not in the way of vessels passing along the shore. A little to the southward are three remarkable hills in-land, by which this part of the coast may be known. They are commonly called the Hills of Cullen. Craig Head is nearly 2 miles to the westward of Scar Nose, and has some *rocks* lying off it. At 2 miles farther is the town of Buckie, between which, and about $\frac{1}{2}$ of a mile from the land, lie *three clusters of rocks*, named the *East*, *West*, and *Middle Muck;* they all cover at high water.

You now enter Spey Bay. When you come from the eastward, Cowsey, the west point of the bay, appears like an island. It is about 14 leagues from Kinnaird's Head, and 13 miles from Craig Head. At 6 miles W. by N from Craig Head, is the River Spey, where small vessels frequently ride.

LOSSIEMOUTH.—To the westward of Spey River is a remarkable black hill, called the

Black Hill of Moray, about 300 feet in height. The coast round Spey Bay is generally low, and the bay of moderate depth decreasing as you near the shore. Lossiemouth is a small tide-haven ½ a mile to the southward of Stotfield Head. This may be considered the southern boundary of the Moray Frith. It appears the entrance of this harbour is gradually washing away and becoming deeper, inasmuch as there are now 12 feet water, where formerly there were only 9 feet. On the western side of Stotfield Head, and running out a mile from the land, is *Halliman's Scars*, or *Covesea Skerries*, many of which are above water; close to them are 8, 10, and 14 fathoms. Between Halliman's Scars and Stotfield Head, lies the small harbour of Stotfield. At 7 miles W. by N. from Stotfield Head, and 5 miles west from Halliman's Scars, or Covesea Skerries, is Burgh Head, being lower than the land adjoining, but terminating in a high cliffy point.

A cast-iron beacon has been placed on the Great Skerry, off the Halliman's Scars, and a new lighthouse built on the Craig Head, near the Covesea Scars. The beacon bears from the lighthouse E.N.E. ¼ E., distant a mile, and consists of a frame-work of iron, surmounted by a cylindric cage, and a cross, 48 feet above high water. There are steps leading from the rock to the cage, in which a temporary shelter may be found, in the event of shipwreck on the rock.

COVESEA SKERRIES LIGHTHOUSE is situated in latitude 57° 43′ 21″ north, and longitude 3° 20′ 14″ west. It bears from Tarbert Ness lighthouse S.E. by S. ¼ S., distant 16½ miles; from Burgh Head E. by S. ¼ S., 5¼ miles; from Stotfield Point W.N.W., 2 miles; and from Scar Nose N.W. by W. ¼ W., 16 miles. It exhibits a revolving light, which gradually attains its brightest state once every minute, and then as gradually declines, until, to a distant observer, it totally disappears. From W. by N. ¼ N. to S.E. by E. ¼ E., the light will be of the natural appearance; but from S.E. by E. ¼ E. to S.E. ¼ S., it will be coloured red. The lantern is elevated 160 feet above the level of the sea; and the light will be seen, in clear weather, at the distance of 6 leagues; and to a near observer, in favourable circumstances, the light will not wholly disappear between the intervals of greatest brightness.

From Burgh Head to Fort George, at the entrance to Inverness, the coast lies about W. by N., 6½ leagues. Between them lies the small tide-haven of Findhorn. It is about 4⅓ miles west from Burgh Head. The shore is low and sandy, with Burgh Head Bay situated between them. This bay has from 5 to 7 fathoms in it, clean ground, deepening to the northward. The town of Forres stands on the east side of Findhorn River, 3 miles south of the entrance; and on a hill near to it is the Trafalgar tower, 70 feet high, forming a good landmark. From Findhorn the coast trends in a W. by S. direction, about 8 miles to Nairn; this part is bordered all the way by a flat extending a mile out to the 3 fathom line.

From Nairn River the coast turns N.W. by W. to Whiten Ness, and thence rounds toward Fort George. A 12-feet *red buoy*, with a conical top, has been placed on the north edge of Whiten Ness Reef, instead of the beacon formerly at that station; it lies in 8 fathoms, with the buoy on the west end of the Riff Bank W.N.W. ½ W., and the Fairway mast-buoy, on the east end of Riff Bank, E.N.E. ¼ E. Off this part a *sand* stretches a good way out, called the *Whiten*, to the northward of which is the *middle ground*, or *Riff Bank*, having from 6 to 12 feet over it. Its west end bears N.E. ½ E. from Fort George Point, distant 1¼ mile. There is a narrow passage between it and the Whiten, but the proper channel is on the northern side. The northen shore is rocky and steep. Having passed the middle, the northern shore suddenly winds round to the south, and forms Chanonry Point; this point forms the narrow strait between Fortrose Point and Fort George, which having passed, the channel runs in westerly towards Inverness. On Fort George Point, or Craig Mee, a 6-feet *red buoy* is now placed in 2½ fathoms at low water, to be left on the port hand going in.

Vessels proceeding towards Inverness should take a pilot.

Chanonry Point light is situated in latitude 57° 34′ 32″ north, and longitude 4° 5′ 28″ west, at the entrance of the Frith, leading to Inverness and the Caledonian Canal. The light is a fixed light. The lantern, which is open from W. ½ N., round to N. by E., in a southerly direction, is elevated 40 feet above the level of the sea; and the light will be seen at the distance of 11 miles, in clear weather.

Navity Bank Buoy is *red*, and lies in 2½ fathoms, on the south edge of the sand, with Chanonry lighthouse S.W. by W., distant 4 miles; and Riff Bank east buoy S.E. ⅝ E., distant 1¾ mile.

Riff Bank Buoys.—Three black buoys have been placed on the Riff Bank, which lies in an east and west direction to the northward of the Whiten Ness sand, they lie about 1½ mile apart. The east Riff buoy is a 12-feet mast-buoy, and lies in 4½ fathoms, with the storehouse on Chanonry Point, shut in by the north corner of Fort George, and in a line with the south brow of Ord Hill, W. ⅝ S. The middle and west buoys are 6-feet buoys, and the middle buoy lies on the N.W. side of the sand.

High water, full and change, at Inverness, at 12h. 14min.; springs rise 14 feet; neaps, 11 feet.

CALEDONIAN CANAL.—The eastern end of the Caledonian Canal is situated at Muirtown, near Inverness, and enters Loch Ness, at the distance of 6 miles from Muirtown. The water in this loch is remarkably deep, having in some places 129 fathoms; along its shores are Castle Urquhart, Fyers, Attsey, and Inverness. The canal then continues to Fort Augustus, at the

south-west end of Loch Ness, and joins Loch Oich; whence it commences with the north-east end of Loch Lochy, and from the south-west end of the loch, near Mucomer; it then runs nearly parallel with the River Lochy, until it ends near Corpeth, at the northern shores of Loch Eli, thus opening the navigation for shipping across Scotland, from the North Sea to the Atlantic Ocean. This canal was opened for shipping in 1825, and has a depth of 15 feet water in its shallowest part.

CROMARTY.—The entrance to Cromarty lies W.N.W., 21 miles from Craig Head lighthouse, and N.E. by E., about 2 leagues from Fort George, having an excellent harbour. Its entrance is nearly a mile wide, the water in it is deep in mid-channel, from 30 to 22 fathoms; and the shores, excepting the south point, are clean. Close to the south point lies a *small rock*, called the *West Suter*, and on the opposite side lies another, called the *East Suter;* excepting these two rocks, you have nothing to fear, at $1\frac{1}{2}$ cable's length from the shores.

CROMARTY POINT LIGHTHOUSE is in lat. 57° 40′ 58″ north, and long. 4° 2′ 7″ west, within the entrance of Cromarty Frith. It exhibits a red fixed light, but is only visible from sea when between the bearings of N.W. by W. and W. $\frac{1}{2}$ N., or when the harbour is open. The lantern is elevated 50 feet above the level of the sea; and the light is visible 9 miles.

Near the East Suter are 6 fathoms, increasing in depth to the southward; to the eastward lies a *shingly flat bank*, of 3 to $4\frac{1}{2}$ fathoms, running off a mile from the point, and 4 near the edge, its outer edge being rather steep, and with gales of wind easterly, the sea breaks over it. This bank extends to the northward, past the Three Kings, extending about $\frac{1}{2}$ a mile from the shore, with 3 to 4 fathoms on it.

At 4 miles E. by N. $\frac{1}{2}$ N. from the entrance of Cromarty, lie the *Three Kings Rocks;* they are small rocks, nearly a mile from the shore, and appear at the last quarter ebb.

A *red buoy* is now laid in $7\frac{1}{2}$ fathoms, near these rocks, with the Duke of Sutherland's monument in line with the west end of the long storehouse at Shandwick, N. by E. $\frac{3}{8}$ E.

To clear these rocks bring Mackenzie's House, which stands on a rising ground to the southward of Cromarty, open outside of the East Suter. From the Three Kings to Tarbert Ness, the course and distance are N.E. $\frac{1}{4}$ E., $9\frac{1}{2}$ miles. Except the Three Kings, the coast, all the way from Cromarty to Tarbert Ness, is clean. Off Tarbert Ness are *some rocks*. The *Culloden Rock* also lies $\frac{1}{2}$ a mile N.E. from the Ness, with only 9 feet on it. An 8-feet black buoy is now moored near the Culloden Rock.

TARBERT NESS LIGHTHOUSE is erected upon Tarbert Ness, bearing from the Three Kings and King's Sons, N.E. $\frac{3}{4}$ E., distant $9\frac{1}{4}$ miles; from Halliman's Scars, at Cowsey Point, N.W. by N., $16\frac{1}{2}$ miles; from Clyth Ness S.W. by W. $\frac{1}{2}$ W., 31 miles, and from Culloden Rock, W. by S., a mile.

Tarbert Ness light is revolving, or intermittent, suddenly appearing like a star of the first magnitude, and continuing in view $2\frac{1}{2}$ minutes, when it is suddenly eclipsed for $\frac{1}{2}$ a minute; thus producing its entire effect once every 3 minutes. It must, however, be observed, that within the Moray Frith, in a south-westerly direction from Tarbert Ness, where the light cannot be mistaken for any other on the coast, it will be permanently visible, until the mariner pass within a line drawn from Tarbert Ness, through a point $\frac{1}{2}$ a mile to the seaward of the King's Sons, or Three Kings, when it will be intercepted from his view by the high land of the coast. The interception of the light by the land will thus form a direction to avoid these *dangerous rocks*.

The lantern is open or glazed seaward, from S.W. $\frac{1}{2}$ W. to W. $\frac{1}{2}$ N., and is elevated 175 feet above the medium level of the sea. The light, in clear weather, will be seen at the distance of 5 or 6 leagues.

Tarbert Ness is at once the northern boundary of the Moray Frith, and the southern extremity of the Frith of Tain, which it divides. In the latter the anchorage is good with all winds, excepting those from the east and N.E. N.W., 4 miles from Tarbert Ness, a *sandy flat* extends all across the Frith, which forms the bar, rendering it unfit for shipping, especially to strangers.

From Tarbert Ness the land turns to the west and S.W., for 3 miles, to the town of Portmaholmack; from thence it curves round to the N.W., about 4 miles, to White Ness, it then runs W. by S., 3 miles, to the town of Tain. Between Tarbert Ness and the bar a deep bay is formed, having from 5 to 2 fathoms in it. A *spit* runs off from White Ness to the eastward, $2\frac{1}{2}$ miles, to the bar, and forms the south side of the channel, and the Gizzing Briggs and Dornoch Sands from the north side. The channel is about 3 cables in width, until past the inner bar buoys, where it becomes wider; but there are *numerous shallows* in the middle, between the Dornoch Sands and the town of Tain, which render a pilot absolutely necessary.

Fairway buoy off Tain Bar.—A 12-feet mast-buoy (red), in 5 fathoms at low water, with the west end of Bentavie Hill in line with Trentham farmhouse N.N.W. $\frac{7}{8}$ W.; west brow of East Suter in line with Meiklerennie farmhouse S.W. $\frac{3}{4}$ W.; and Tarbert Ness lighthouse S.E. $\frac{3}{4}$ E., distant $3\frac{3}{4}$ miles.

Inner Tain Bar north buoy.—An 8-feet buoy (black), in $2\frac{1}{2}$ fathoms at low water, Tarbert Ness lighthouse E.S.E. $\frac{3}{8}$ S., and the Fairway buoy, off Tain Bar, E. $\frac{3}{4}$ S., $1\frac{1}{2}$ mile distant.

Inner Tain Bar south buoy.—A *red* buoy is placed in $4\frac{1}{2}$ fathoms, with a remarkable hollow, or notch, in the high land east of East Suter, in line with Meiklerennie farmhouse, S.S.W. $\frac{3}{8}$ W.;

Tarbert Ness lighthouse E.S.E. $\frac{3}{8}$ S.; Fairway buoy, off Tain Bar, E. $\frac{1}{4}$ N.; Inner Bar north buoy (black), E.N.E. $\frac{3}{8}$ N.; and Dornoch Spire N.N.W. $\frac{3}{4}$ W.

When running for the Bar of Tain you will pick up the leading-mark for crossing the bar, which is the south side of Airdcross Hill in one with the north fall of the hill of Tain, bearing W. $\frac{1}{4}$ N., when 2 miles northward of Tarbert Ness; this will lead you past the red fairway beacon-buoy, across the bar, where there are 12 feet at low water, spring-tides, and between the two inner bar buoys, leaving the black buoy to the northward, and the red buoy to the southward of you. After passing the bar buoys the water deepens to 7 or 8 fathoms for about a mile; here you should stop, if without a pilot.

At the bar it is high water at 11h. 47m., full and change, and the tide rises 14 feet: the river is navigable up to Bonar Bridge, 14 miles from the bar.

From Tarbert Ness to the Ord of Caithness, the course is N.E., a little easterly, 20 miles; to Clyth Ness N.E. by E. $\frac{1}{2}$ E., 31 miles; and from Clyth Ness to Noss Head, N.E. by E. and N.E. $\frac{1}{2}$ N., 11 miles.

From the bar of the Frith of Tain the coast runs circularly towards the Ord of Caithness; some parts being rocky, and therefore must always have a good berth in passing; the Ord Head is high, steep, and rocky, the cliffs being almost perpendicular.

From ORD HEAD to CLYTH NESS a ragged rocky shore extends, without anchorage or harbour. Inland are the Paps of Caithness, two remarkable hills, with pointed tops, like sugar-loaves; these are visible a great way off, and point out your approach to this part. The course and distance from Ord Head to Clyth Ness, are E. by N., 15 miles.

A little to the southward of Clyth Ness is a *great rock*, above water, having several lesser ones round it. Close to it are from 9 to 12 fathoms; but it will always be prudent to give it a good berth.

At Latheronwheel, about 5 miles to the westward of Clyth Ness, a small fixed light is shown at the south entrance, lighted only on dark nights, towards the end of the fishing season.

NOSS HEAD is remarkable for its high cliffs. At $1\frac{1}{4}$ mile to the southward of Noss Head is Staxigo, a tide-haven, where small vessels sometimes lie; and $1\frac{1}{2}$ mile farther is Wick, another small port, showing s small fixed red light on the south pier-head; but generally the shore between Clyth Ness and Noss Head is very bold, rugged, and rocky.

Noss Head Lighthouse in latitude 58° 28′ 38″ north, and longitude 3° 5′ 5″ west; it bears from Duncansby Head S.S.W. $\frac{3}{4}$ W., 10 miles; and from Sarchel Head N.E. $\frac{1}{4}$ N., $6\frac{3}{4}$ miles. This lighthouse shows a revolving light, which attains its brightest state every $\frac{1}{2}$ minute, and, to a distant observer, gradually disappears. The light will be visible round by north and east, between W.N.W. and S.W. $\frac{1}{4}$ W. From S.W. $\frac{1}{4}$ W. to N.E. $\frac{3}{4}$ N. round by S.E. the light is of a natural colour, but from N.E. $\frac{3}{4}$ N. to W.N.W. northerly, or within Sinclair's Bay, it is coloured red. The lantern is 175 feet above the level of the sea, and to a near observer, in favourable weather, the light will not totally disappear between the intervals of greatest brightness.

SINCLAIR'S BAY lies on the north side of Noss Head. It is large and of moderate depth, with clean ground, and can be resorted to with off-shore winds. Freswick Bay, to the N.N.E. of Noss Head, about 7 miles, is also a good place to stop a tide in.

DUNCANSBY HEAD.—At $10\frac{1}{2}$ miles N.N.E. $\frac{1}{2}$ E. from Noss Head is Duncansby Head, the N.E. point of Scotland. It is formed of perpendicular cliffs, and appears very similar to Noss Head, so much so, that it is often mistaken for it. But Duncansby Head, as already observed, may always be distinguished from Noss Head by Duncansby Castle, or John o' Groat's House, which is a high rock, seated over the land, and may, as before observed, be seen 15 miles off. The new lighthouse on Noss Head will be another distinguishing mark.

DIRECTIONS FOR SAILING FROM BUCHAN NESS TO DUNCANSBY HEAD, INCLUDING THE FRITHS OF MORAY AND TAIN, ETC.

VESSELS bound from off Buchan Ness to the Moray Frith, should steer north or N.N.E., according to their distance from the shore, taking care to keep Buchan Ness in sight, outside of the outermost houses of Peterhead, in order to avoid Scotstown and Rattray Briggs; or if desirous of going near to the point of Rattray Briggs, bring Stirling Hill on with the innermost houses of Peterhead, and keep it so, until Mormond Hill comes open to the westward of Rattray Head; you will then be to the northward of that reef, and may steer N. by W. $\frac{1}{2}$ W., until Troup Head comes open outside of Kinnaird's Head, or until Kinnaird's Castle and lighthouse bear to the westward of W.N.W., either of which will lead clear of the Cairnbulg Scars.

Kinnaird's Head is steep-to; and the course and distance thence to the extremity of Halliman's Scars, or Covesea Skerries, are N.W. by W. $\frac{1}{4}$ W., 41 miles. The coast between Kinnaird's Head and Scar Nose is rising ground, and the shore steep, except the rocks before mentioned, having 14 to 16 fathoms near it; and at the average distance of 3 or 4 miles off, are 20 to 24 fathoms, beyond which it deepens, with irregular soundings, mostly mud. Therefore when working to windward, you should not stand into a less depth than 16 fathoms. Vessels may anchor in Aberdour Bay, and in all the bays between Troup Head and Scar Nose, with off-shore winds. In Spey Bay there is also good anchorage, on clean ground, in every part.

The course from off Halliman's Scars, or Covesea Skerries, to Cromarty, is about W.N.W. $\frac{1}{4}$ W.; and the distance 22 miles. If bound to Fort George, keep along the north shore all the way from the West Suter, until nearly abreast of the Three Burns, off which a *reef* stretches 3 cables' length, which you must give a berth to by passing to the eastward of the Navity buoy. The coast here is high and very rocky.

INVERNESS.—*When approaching Inverness*, you may pass on either side of the Riff Bank, the outer buoy of which lies E. by N., 4 miles from Fort George. The southern channel is very narrrow by Whiten Ness buoy; but it has the deepest water, having not less than 5 fathoms at low water, spring-tides, in the shoalest part of the channel. The leading-marks through are, Man's Cot (which lies to the eastward of Fort Rose), in one with Towrie Lumb Wood, until you arrive at the Craig Mee buoy, when you may haul to the southward for Chanonry Point; in the latter course you leave the three buoys on the Riff Bank, on your starboard hand, at some distance, passing close to the red buoys on Whiten Ness, and Craig Mee on your port hand.

When entering by the northern channel, you must leave the Navity buoy on your starboard hand, and the three Riff Bank buoys on your port side, keeping about $\frac{3}{4}$ of a mile from the shore; and from the west Riff buoy, steer for Chanonry Point, between which and Fort George the water is deep, from 14 to 24 fathoms.

CROMARTY.—To sail into Cromarty Harbour, keep in mid-channel, till round Cromarty Point; then run about a mile to the westward along the south shore, and anchor in 6 or 7 fathoms water, with a deep gulley on the south shore, up and down, and Cromarty Point bearing E.S.E. In turning, stand no nearer to the West Suter, and the bay eastward of the town, than to bring Cromarty Point on with the houses at Invergordon, or on the corner of the wood within the houses. The shore, from the Suter to the ferry, is steep; but when above the ferry, stand no nearer the bank, than to bring the low shingly point of the ferry near to the East Suter; which mark is good so far up as the anchoring place but no farther. The south shore, above the town, may be approached, by the lead, into 5 or 4 fathoms. All the ground, from the town to a mile above it, is good for anchoring.

Ships sailing from Cromarty, and bound to the north-eastward, must give the shore a berth after passing the East Suter, in order to avoid the bank before mentioned; and, after having passed it, should keep M'Kenzie's house open of the East Suter, until they have passed the Three Kings. From thence the shore may be approached to within a cable's length, until near Tarbert Ness, to which must be given a berth of a mile at least, in order to avoid the *Culloden Rock*, which is now marked by a black buoy. This part will be no longer dangerous to shipping, as the new lighthouse will lead clear of all dangers.

If a vessel is situated at the distance of 3 or 4 miles off Buchan Ness, and bound through Pentland Frith, to the westward, the course will be N.N.E., 9 miles, until Kinnaird's lighthouse bears to the westward of N.W., in order to avoid the Rattray Briggs; the course and distance will then be N. $\frac{3}{4}$ W., about 24 leagues; but, with scant wind from the eastward, and a high sea, you should steer north, to prevent your falling to leeward, and being obliged to bear up for Cromarty.

TIDES FROM BUCHAN NESS TO DUNCANSBY HEAD.

IT is high water, full and change, at Buchan Ness, at 0h. 50m.: at Fraserburgh, 0h. 40m.; Banff, 0h 40m.; along shore to Cowsey Point and at Cromarty, at 12h. 30m.; at Fort George and at Inverness, at 12h. 14m.; in the Frith of Tain Bar at 12h., and at Sinclair's Bay at 11h.

The rise of the tide is, at Buchan Ness, with springs, 13 feet, neaps 8; Fraserburgh and Banff, springs rise 11 feet, neaps 6 feet; Cowsey Point, springs 15 feet, neaps 9 or 10: Fort George and Cromarty, springs 14 feet, neaps 11; Frith of Tain, springs rise 14 feet, neaps 8; and Sinclair's Bay, springs 9, neaps 5.

From Duncansby Head the stream diminishes in strength to the southward. Off Clyth Ness its velocity is 3 knots with springs, and $1\frac{1}{2}$ with neap-tides; continuing thus to the Ord Head. In the bays of Sinclair and Freswick there is no current, as they fall within the stream.

Off the entrance of Cromarty the stream runs at the rate of from $3\frac{1}{2}$ and 4 knots in springs, and 2 at neaps. At Fort George the current runs very strongly. Off Kinnaird's Head the stream runs about 2 knots in springs, and increases as it passes round, till off Peterhead, where it runs at the rate of 4 knots in springs, and $2\frac{1}{2}$ in neap-tides. But observe, that here the flood without sets partly on the shore, which, if not attended to, in light winds and a heavy sea, may prove dangerous. When in the offing, 6 or 7 miles eastward of Kinnaird's Head, the stream does not turn to the northward until 3h. 15m.

FROM DUNCANSBY HEAD TO CAPE WRATH, THROUGH PENTLAND FRITH AND THE ORKNEYS.

Description of the Coast, Islands, &c.

From DUNCANSBY HEAD to CAPE WRATH.—Pentland Frith lies between the coast of Caithness and the Orkney Islands, and is a well frequented passage leading from the North Sea to the Western Ocean.

PENTLAND FRITH.—Masters of vessels wanting pilots, if from the eastward, should call off Noss Head; or from the westward, off Holburn Head, where they have plenty of room to lay out of reach of the Pentland and Frith tides.

During the late survey a *shoal*, of 5 to 8 fathoms, was discovered midway between Duncansby Head and Stroma, causing a *dangerous race*, called the *Bore of Duncansby*.

The PENTLAND SKERRIES are *some rocky Islands*, lying E. by N., distant $3\frac{1}{4}$ miles from Duncansby Head, the larger island being in latitude 58° 41′ 30″ north. Two lighthouses are erected on the Great Skerry, being nearly N.N.E. and S.S.W. of each other, distant 105 feet. The high light is 170 feet above the sea at high water, and the low light 140 feet. They are both fixed lights, visible 18 and 16 miles off, when the weather is clear, and when in a line, lead clear of the foul ground to the southward of the Skerries.

The bearings and distances of the most conspicuous headlands from the above lights, are the island of Copinsha N.E. by E., distant 14 miles; and Roseness Head, which forms the east side of Holm Sound, N.E. $\frac{1}{4}$ N., distant 11 miles.

The south end of the island of Swona bears from the lights N.W. by N., distant 5 miles; the north end of the island of Stroma N.W. by W. $\frac{1}{4}$ W., distant 6 miles; Turn Ness Head, or S.W. point of Hoy Walls, or Waes, N.W. $\frac{1}{2}$ N., distant $12\frac{1}{2}$ miles; Duncansby Head W. by S. $\frac{1}{2}$ S., distant $4\frac{1}{4}$ miles; Noss Head S.W. $\frac{1}{4}$ S., distant 13 miles; the Little Pentland Skerry bears south, a mile; and the outermost rock of the foul ground S.E., distant $1\frac{1}{2}$ mile.

The coast, from the N.E. part of Duncansby Head to St. John's Head, runs somewhat in a circular direction, these two points bearing from each other N.W. $\frac{3}{4}$ W. and S.E. $\frac{3}{4}$ E., distant 5 miles; to the northward of St. John's Head is a *reef of rocks*, called the *Men of Mey*. From thence to Dunnet Head the distance is $5\frac{1}{2}$ miles, nearly, in the same direction.

DUNNET HEAD LIGHTHOUSE exhibits a steady fixed light, elevated 346 feet above the level of the sea, and appears like a star of the first magnitude, at the distance of 7 or 8 leagues; and at intermediate distances, according to the state of the atmosphere. The lighthouse, built

of stone, 45 feet high, is in latitude 58° 40′ 16″ north, and the light will be visible to the mariner, in a northerly direction, from S.E. ½ E. to west.

DUNNET HEAD is high, steep, and rocky. W. ½ S. from the lighthouse, distant 6 miles, is Holburn Head, the land between bending inward, and forming Thurso Bay and Scrabster Road. Within both these, vessels may occasionally find anchorage. At a mile E. by S. from Holburn Head, there is a *rocky bank*, with only 8 to 9 fathoms on it, and there are 20 and 23 fathoms within a cable's length of the north side, and 16 to 18 fathoms on the south side of it. It is high water, full and change, at 8h. 28m. ; springs rise 15 feet, neaps 12 feet.

W.N.W., 4 miles from Holburn Head, is Brims Ness, from which a *rocky reef* runs out full ⅓ a mile. The coast is rocky all along ; and there are *several rocks*, above water, reaching from the Cleat Rocks towards the Ness, nearly W.N.W., 11 miles from Brims Ness, in Strathie Head. Several small bays lie between ; and the shore is generally high and rocky. W. by N. ¼ N., distant 10½ miles from Strathie Head, lies Roan Island, which divides the entrance to the Kyle of Tongue into two parts, the south-eastern passage is called the Kyle of Rannoch. The Kyle of Tongue is a spacious opening, within which lie the Rabbit Islands. Vessels proceeding here, from the eastward, will find the passage to the south-eastward of these islands safe, with from 10 to 11 fathoms between the Roan Islands and the shore, and 8 fathoms abreast of the Rabbits ; but above the Rabbits it becomes suddenly shallow. Whiten Head lies N.W. by W., 7½ miles from Roan Islands, it is a broad and rocky headland, with some *few rocks*, above water, about it ; but they are steep-to, and without danger. When abreast of these, a W.S.W. course will open Loch Eribol.

LOCH ERIBOL is a wide and extensive branch of the sea, running in a S.W. by W. ½ W. direction, 8 miles. In it is good anchorage, either to the northward of Chore Island, or farther west, and nearer to the end of the loch. The bottom is mud, and the depth from 10 to 7 fathoms above the Island Chore, but below the island the water is deeper. There are no rocks, except those near the shore ; and the high land of Ben Spuno affords shelter to the anchorage. Off the entrance of the loch there are the *Cloven Rock*, *Duskerry*, the *Sparrow*, which is awash, *Klowrig*, and *Hoan Island*. It is not advisable to go inside of these, as many *scattered rocks* lie about them.

At 6 miles to the north-westward of Whiten Head, is a point of land, called Farout Head, making the eastern point of Durness Kyle. There are *several rocks* about Farout Head ; but they lie close in, except the *Clackmore Rocks* to the eastward. The middle of the Kyle is clear of danger, and has 10, 9, and 8 fathoms water within it. It is, however, too open to the north-eastward for vessels to anchor there in safety. On the north-western part of the entrance are the Garve, and Gray Flag Islands. The western land is high and rugged, having a remarkable barren appearance, and usually called the Forest. This extends all the way to Cape Wrath.

CAPE WRATH, or RATH, is a high and steep headland, having *many rocks* about it, and, therefore, must always have a wide berth given to it in passing. A stone lighthouse, of a white appearance, is erected upon it. Cape Wrath forms the north-western extremity of the main land of Scotland, in latitude 58° 37′ north, and longitude 5° west.

This light will be known to mariners as a revolving light, exhibiting, from one and the same lantern, a light of the natural appearance, alternating or changing with one tinged red ; which two kinds of lights successively attain their most luminous effect every 2 minutes, and thereafter becoming gradually less luminous, are, to a distant observer, totally eclipsed for a short time.

The lantern light-room is elevated 400 feet above the medium level of the sea. The light of the natural appearance will, in clear weather, be seen, like a star of the first magnitude, at the distance of 8 leagues, and at lesser distances according to the state of the atmosphere ; but the red light, being somewhat obscured by the coloured shades, will not be seen at so great a distance.

During a gale from the N.E., with a tremendous swell of the sea upon this part of Sutherland, the persons employed in erecting the lighthouse upon Cape Wrath, observed the waves breaking very high over the Nun Rock. The reef appeared to extend about a league S.S.W. and N.N.E., having in some places not more than 2 and 2½ fathoms over it at low tides. It seems to be connected with the Stack and Skerry by a fishing-bank, of from 25 to 30 fathoms.

The STAGS lie off Cape Wrath, N.E. by E. ¼ E., distant a mile, and are *very dangerous ;* but the lighthouse will now always enable the mariner to give them a wide berth. Bulgie Island, in sight, clear of the Cape, bearing S.W. by W. ¾ W., clears the Stag Rock to the westward, and the highest part of Farout Head S.E. ¼ S., open east of Garve Island, clears the Stag Rock to the northward.

The NUN ROCK and BANK.—North, 32° east from Cape Wrath, distant about 15 miles north, 10° east from Farout Head, distant 17 miles ; and north 6° west from Whiten Head, distant 21½ miles, is the Nun Rock, from which the Stack Rock just appears above the horizon. The Nun Rock terminates in a point ; upon which, with low tides, there are not more than 15 feet water. By the last survey, 3¼ fathoms was the least water found on the Nun Rock. Within the distance of 6 yards from the centre of the rock, are 4½, 5, 6, 7, and in one spot 11 fathoms ; in another 16 fathoms ; at the distance of 30 yards are 18 fathoms. From the middle of the rock, sounding round a radius of 80 yards, in all directions, there are from 6 to 12 fathoms ; so irre-

gular is the depth, that the same water is nowhere to be found twice within the space of a yard extending the radius to 250 yards, it gives from 12 to 18 fathoms, with a similar irregularity.

From the shoalest part, in a westerly or southerly direction, the rock extends 500 yards, to the depth of from 19 to 24 fathoms; then clean ground and deep water; while at a similar distance eastward and northward, there are from 20 to 25 fathoms; then foul ground, with 25 fathoms to a considerable distance; the whole mass forming a rocky circle, about 1,000 yards in diameter. This is situated upon the S.W. edge of an extensive bank of rotten rock, which runs to the N.E. and N. by E., full 10 miles; and to the eastward, so far as the Stack and Sule Skerry, where its breadth is about 6 miles; thus the length of this shoal is nearly 30 miles, and the water over it from 25 to 30 fathoms.

Between this bank and the coast of Scotland the deepest water is 50 fathoms; the bottom commonly of coarse sand, gravel, and broken shells, separately or combined. Near the land, in less depth than 30 fathoms, black stones abound, and so they do round the Nun Rock.

Upon the rock it is high water, full and change, at 11 o'clock. Spring-tides set at the rate of 4 miles, and neaps 2 miles an hour. The flood runs to the eastward, first E.N.E.; middle, east; and the latter E.S.E.

E. $\frac{1}{2}$ S. from the Nun Rock, distant 19 miles; N. $\frac{1}{2}$ E., 26 miles from Strathie Head; and N.W., a little westerly, 25 miles from Hoy Head, in the Orkneys, lies a *rock*, above water, called the *Stack*; and E. by N. from the Stack, $2\frac{1}{2}$ miles, is a *similar one*, called the *Sule Skerry*. The adjacent part is all rocky ground, with from 17 to 30 fathoms water, and forms the eastern part of the Nun Bank.

THE ORKNEY ISLANDS.

GENERAL REMARKS.—The Orkneys are a cluster of islands, lying to the northward of Duncansby Head, of various shapes and sizes, 26 of which are inhabited. The smaller islands are called Holms, and are chiefly used for pasturage. The principal islands are named as follow:—South Ronaldsha, Flota, Hoy Walls, or Waes, Pomona, Burra, Copinsha, Shapinsha, Rowsa, Westra, Eda, Stronsa, Sanda, and North Ronaldsha, having several other small islands of inferior note between them. They are mostly separated by deep and navigable channels, through which mariners may pass in safety.

These islands are of irregular heights, being in some places high and prominent, and in others low and undistinguishable. Their eastern side lies nearly in a N.E. $\frac{1}{4}$ E. direction; and from the Skerry lights to Dennis Ness, the northern point of North Ronaldsha, the distance is about 46 miles. The northernmost islands are *low* and *dangerous*, being frequently enveloped in thick fogs, the atmosphere very rarely continuing clear for any considerable space of time. They are also subject to heavy gales.

Vessels coming from the north-eastward will observe a lighthouse erected on the Start of Sanda, 100 feet above high water, which may be seen 4 or 5 leagues. The high light of the Pentland Skerries will be visible at an uqual distance; and Kinnaird's Head light can also be seen at a great way off in the offing. The mariner ought to be particularly careful not to mistake these lights one for another, for should he do so, the most fatal consequences may ensue. He will also observe that the light on the Start will, on and after the 1st September, 1854, be altered from a revolving light to a fixed light of the natural colour; at the same time a new light will be exhibited from Dennis Head, the north point of North Ronaldsha, which will produce a bright flash in every 10 seconds, and visible 18 miles. The new light will be elevated 140 feet above the level of the sea.

The currents in the North Sea should be particularly attended to, for the tides are not regular until you come near the Orkney and Shetland Isles. The tides also keep a regular course between the Orkneys and Shetland; only observing, you have to make an allowance for the time the tide runs longer, according to your offing; for in the middle you have the tide 3 hours longer than near the shore.

The EASTERN SIDE of the ORKNEYS.—The Pentland Skerries lie S.S.W. $\frac{1}{2}$ W., $2\frac{1}{2}$ miles from Old Head, in South Ronaldsha. Old Head is the south-eastern part of the island, and Grim Ness the north-eastern part; they bear from each other N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S., distant 5 miles. Off Old Head, E.S.E., distant $\frac{1}{4}$ of a mile, lies the Old Skerry; bring thr North Kirk of South Ronaldsha open of Halcrow Head, and you will go on the outside of it.

From the Old Head to Copinsha the course and distance are N.E. by E. $\frac{3}{4}$ E., about 12 miles. Halcrow Head lies $1\frac{1}{4}$ mile N.E. by N. from Old Head. Between Halcrow Head and Grim Ness, off the middle of the bays of Lyths and Windwick, you may anchor, on clean ground, keeping Rose Ness on with, or rather a little outside of Grim Ness. Between Halcrow Head

and Grim Ness, the tide, during the first 4 hours of flood, runs to the northward; and from that time to the last of the ebb, the stream runs to the southward.

About N.E. $\frac{1}{4}$ E., distant $3\frac{1}{2}$ miles from Grim Ness, is Rose Ness. Between them are the entrances of Water Sound and Holm Sound; these are *dangerous* in an easterly gale and flood-tide, particularly Water Sound. The former lies between Ronaldsha and Burra Isles, and the latter between the Islands Burra and Pomona. Between Grim Ness and the entrance of Water Sound, you may anchor, on clean ground, about $\frac{1}{2}$ a mile from the shore.

COPINSHA ISLAND extends nearly a mile N.E. and S.W., and is $\frac{1}{2}$ a mile broad. On the south side of this island a vessel may stop a tide, about $\frac{1}{2}$ a mile from the shore. About $\frac{1}{2}$ a mile N.E. by N. of Copinsha, lies the *Horse*, and half-way between these is a *small sunken rock*, having only 9 feet on it at low water, spring-tides. You will avoid it, when going through this channel, by keeping to either side; but rather towards the Horse, because there is deep water within 20 yards of that island. There is a *flat*, extending from the westernmost of the Holms of Copinsha all along the N.E. side to Copinsha, having only 3 fathoms on it; a flat runs off from the Air point two-thirds of a mile in a S.S.W. direction, on which are 2 knolls of 6 feet only, these lie $\frac{1}{3}$ of a mile from the point; the general depth on the flat is $2\frac{1}{2}$ and 3 fathoms. Those who go through this channel will avoid the shoals on either side by keeping one-third of the distance from the Holms, and two-thirds from the point of Air. In this passage are 3 to 5 fathoms at low water.

In sailing along the east side of Deer Ness, be sure to keep more than $\frac{1}{3}$ a mile from the shore, for there is a *flat* runs off from the Kirk of Deer Ness, about $\frac{1}{2}$ a mile to the E.S.E., which is almost all dry with spring-tides. A little to the northward of the outer end of this flat, and S.E. from Sandside, lies a *rock*, which dries at half-ebb.

MULL HEAD, on the east side of the entrance of Deer Sound, lies $4\frac{3}{4}$ miles N. $\frac{3}{4}$ E. from Copinsha Island. Auskerry Island bears N.E., 8 miles from Copinsha Island; and Fair Isle bears E.N.E., distant about 17 leagues from it. Between Deer Ness and the Island of Shapinsha, is the entrance to Kirkwall, which is the chief town in the Orkneys, having an old cathedral, and about 300 houses. It carries on a considerable trade.

A lighthouse is erected on the pier-head at Kirkwall, and exhibits a fixed light all night, from August till April.

About $\frac{1}{4}$ of a mile E.N.E. from the northernmost part of Auskerry Isle, lies a *sunken rock*, on which are 6 feet at low water; and about a cable's length from the N.W. part of the island, are *three small rocks*, two of which are always visible. Nearly $1\frac{1}{2}$ mile N.E. by N. from the N.W. part of Auskerry, and $\frac{3}{4}$ of a mile from the shore of Stronsa, lies a *rocky shoal*, called *Ingald*, appearing at 2 hours' ebb. Between the west end of this shoal and the shore, it almost dries with low spring-ebbs. Those who go through between Auskerry and Stronsa, should keep nearer to Auskerry, and they will thereby avoid danger.

ROUSHOLM Bay, on the south side of Stronsa Island, is clean ground, and a convenient place to anchor in: near the west side of the bay is the safest part in the winter-time. Odin Bay, on the east side of Stronsa, is also all clean ground, and convenient to stop a tide in. Off Rousholm Bay, and between Auskerry and Stronsa Islands, the stream, during the first 3 hours of flood, runs to the eastward; and from that time, until low water, it runs to the westward.

About $2\frac{1}{2}$ miles N.E. by E. from the S.E. part of Auskerry Isle, is Lamb Head, the S.E. point of Stronsa Island, remarkably high land; and a mile N.E. by N. from Lamb Head, is Burrow Head, which is lofty. From Lamb Head, the Start, or N.E. point of Sanda Island, bears N.E. $\frac{1}{2}$ E., distant nearly 13 miles. Odin Ness is about $2\frac{3}{4}$ miles N.N.E. $\frac{1}{4}$ E. from Lamb Head.

Above $\frac{1}{2}$ a mile N.N.E. from Odin Ness, lies a *rock*, called the *Bow*, appearing only at spring-tides. By keeping Burrow Head without Odin Ness, you will easily go clear of it on the east side; and to clear it on the north side, when going into Odin Bay, keep half-way between Odin Ness and Grice Ness; then steer to the westward, and anchor, in $4\frac{1}{2}$ or 4 fathoms; the bottom being sand, and sand with shells.

About N.E. $\frac{1}{2}$ N., 6 miles from Odin Ness, is Tres Ness, the S.E. point of the Isle of Sanda. At $1\frac{1}{2}$ mile N.E. $\frac{3}{4}$ E. from this point, are *some rocky shoals*, extending $1\frac{1}{2}$ mile from the end of Tres Ness, parts of which are visible at low water. To clear them on the east side, in sailing northward or southward, approach no nearer to Tres Ness than till the easternmost houses of Newark come on with the chapel of Arstas.

The START lies 5 miles E. by N. from Tres Ness, with a lighthouse upon it, already described. Between them lies Newark Bay, in which you may anchor, on clean ground, within $\frac{1}{2}$ a mile of the shore; but you should avoid the east and west sides of the bay, which are foul and rocky. The most convenient part for anchoring in is, off the sand, with the house of Newark bearing W.N.W., distant $\frac{3}{4}$ of a mile.

In Otterswick Bay, westward of Taft Ness, a 7-feet black buoy is laid on a *sunken rock*, with Bride's Ness point, North Ronaldsha, bearing E.N.E. $\frac{1}{4}$ E.; Start Point lighthouse S.E. N.B.—The fairway is on the east side of the buoy.

BRIDE'S NESS, the S.E. point of North Ronaldsha, lies N.N.E. $\frac{1}{4}$ N., $4\frac{3}{4}$ miles from the Start. Between them lies the east entrance of North Ronaldsha Frith. About $1\frac{1}{4}$ mile S.E. $\frac{1}{2}$ E.

from Bride's Ness, and 4 miles N.E. by N. from the Start, lies the outer edge of the middle of the *Reef Dike*, which thence extends N.N.E. and S.S.W., about $1\frac{1}{4}$ mile; and is, at its middle or broadest part, nearly $\frac{1}{2}$ a mile across. This is a *reef of sunken rocks*, having on its shallowest part, which is that next to Bride's Ness, only 5 feet at low water. As there are always breakers, or ripples upon it, vessels can seldom go over it without great danger. Even when the water is smoothest, the rocks may easily be distinguished by a dark-coloured rippling tide running along them; and the depth, in approaching them on either side, shoals gradually.

DENNIS HEAD, on which is the new lighthouse, and a stone-beacon, surmounted by a ball, lies N.E., 2 miles from Bride's Ness, and N.N.E. $\frac{3}{4}$ E., 6 miles from the Start. About $\frac{1}{2}$ a mile to the northward of Dennis Head lies a *rock*, called *Seal Skerry*. A small part of it is always above water. Between this rock and the shore it is almost dry at low ebbs. The Altars of Linnay extend above $\frac{1}{4}$ of a mile to the northward from the shore of the north-west part of the island. Ships in passing by the south-east part of Dennis Head, should give it a berth of about a cable's length. Off Dennis Head, and thence southward, outside the north end of the Reef Dike, the stream, during the first 3 hours of the flood, runs S.S.W., and from that time till low water, it runs N.N.E.*

About a mile northward from Dennis Head, there is, even in the calmest weather, a rough breaking sea with the ebb-tide, which, with spring-tides, and westerly winds, becomes exceedingly violent. Between this rough sea and the shore, is an eddy during the flood-tide, in which a vessel may sometimes continue tacking until the tide is done.

WESTERN SIDE of the ORKNEYS.—The western points of the Orkney Islands may more readily be distinguished than those on the east, because Hoy Head will always be the first land made in coming in from the west. This is the highest of all the Orkneys, and called the Ward Hill of Hoy; its summit being 1,620 feet above the level of the sea. Hoy Mouth, the sound or inlet of which Hoy Head forms the southern point, leads to Stromness, an excellent harbour, much resorted to by strangers, and the best for vessels bound out to the west; but a pilot should be obtained, if you are not thoroughly acquainted with the navigation.

The HARBOUR OF STROMNESS is bounded on the S.W. by the Island of Gremsa, and on the opposite side by the main land. Between Gremsa and the main is the *Riddock Shoal;* it lies off the east end of Gremsa and extends north and south, being nearer the island than to Orfer Head. It is composed of large stones, rent during tempestuous weather from the adjacent land. At extraordinary low tides there are not more than 12 feet water over it. In order to avoid this shoal in sailing from the southward, along the south and east sides of it, bring Stromness old kirk a sail's breadth open to the northward of the N.E. point of Gremsa, till the Kame of Hoy comes to the westward of Windbree House; then steer for the anchorage, at the back of the Holms of Kerston.

HOY SOUND LIGHTHOUSES, on GREMSA ISLAND.—The high lighthouse is in latitude 58° 56′ 9″ north, and longitude 3° 16′ 33″ west. The lighthouses bear from each other S.E. $\frac{1}{4}$ E. and N.W. $\frac{1}{4}$ W. The high light, towards the western entrance of Hoy Sound, is a fixed *red light*, and the low light is a fixed bright light. When seen in one, they lead through the western entrance to Hoy Sound, in the fairway, between the *dangerous rocks of Bow*, off the Hoy shore, and *Kirk Rock* off the Stromness shore. After running on this line to a point $\frac{1}{2}$ a mile off the low light, where the depth is about 8 fathoms, the high red light will be suddenly eclipsed by the land; and it is then time to haul towards the Stromness shore, when the red light will immediately re-appear.

The high light is 115 feet above the sea, but, being a fixed red light, it will not be seen at a greater distance than about 10 nautical miles; it illuminates a small arc, towards the S.E. from S.E. by E. to S.E. $\frac{1}{2}$ S., facing the western entrance to Hoy Sound. Towards Stromness, the high tower shows a fixed bright light, from S.S.E. $\frac{1}{2}$ E. to W.S.W.

The low light is a fixed bright light, elevated 55 feet above the sea, and will be seen at the distance of 11 miles, in clear weather. The arc illuminated by this light extends from E. $\frac{1}{2}$ S. to W. $\frac{1}{2}$ N., and faces northward.

In August, 1851, an additional fixed light was exhibited from the high tower on Gremsa Island. This light illuminates a small arc, from N. $\frac{1}{2}$ W. to N.N.W. $\frac{1}{2}$ W., in the direction of the islands Cava and Risa, and is intended to guide vessels from the south-eastward. Variation 27° 47′ west.

The distance from Hoy Head to Marwick Head is 12 miles N.E. by N. The coast between, from Brakness, the north side of the entrance of Hoy Mouth, is all a bold cliffy shore, with deep water close to. From Marwick Head, about N.E., 2 miles, is a small island, called the Brough of Birsa: and thence E. by S., 4 miles, is Costa Head, the northern extremity of the Island Pomona.

The *North Shoal* is a *sunken rock*, with only 12 feet on its shoalest part, lying N. $\frac{3}{4}$ W., $6\frac{1}{2}$ miles from Marwick Head, and N. by E. $\frac{3}{4}$ E., 6 leagues from Hoy Head; that part of it, where the depth is less than 4 fathoms, is not above a cable's length long; and the water

* A new lighthouse is erected on the north part of North Ronaldsha, described in page 64.

shoals gradually towards it on the east and south sides, from ½ a mile distant. In fair weather the rippling of the tide may be seen on it, at some distance, and in blowing weather the sea always breaks over it. To avoid it on the east side, keep within 3 or 4 miles of the land. The Brough of Birsa may be passed at 2 cables' length distance.

ENHALLOW SOUND.—To the S.E. of the North Shoal, is the entrance to Enhallow Sound, lying between Pomona and the Isle of Rowsa, and which takes its name from an island in the middle of the sound. There is a fairway through, but the island should be left on the port side, and a pilot is required. In case of necessity, however, you may venture in, by keeping as nearly in mid-channel as possible, or rather more to the island side. A boat may here be had upon a proper signal.

From Costa Head, the north point of Pomona Island, to Noup Head, the N.W. point of the Island of Westra, the bearing and distance are N.E. ¼ E., about 11½ miles; and from thence to Moul Head the course is east, 6¼ miles.

Westra Frith lies between the islands of Rowsa and Westra, and is a large inlet, in which there is plenty of room for working; but there is a *ridge of rocks* on the Westra side, called the *Skerries of Skea*. To avoid them it will be proper to tack when half-way over from the western side. The latter is bold, and there is nothing to fear. In the day, and by reference to the chart, vessels may sail from the westward through this place, and out to the eastward, or from the eastward to the westward, without a pilot, by making a proper allowance for the tide; observing always, that the flood sets to the eastward and southward, through the islands, and the ebb contrary.

Runabrake is a *sunken rock*, with 3½ fathoms over it, lying between North Ronaldsha and Papa Westra, and bearing from Moul Head S.E. ½ E., distant 7½ miles, and N. by E. ¼ E., nearly 3 miles from the Holms of Ire. The Holms of Ire are two small islands lying near a point of Sanda, having *some sunken rocks* to the north-eastward of them. The marks to clear the Runabrake to the northward are, Holland House in Papa Westra, open North of Papa Pile, bearing W.N.W.; Start light open of Tafts House, bearing S.S.E. ½ E., clears it to the eastward; and the Free Kirk of Sanda, open west of Whal Point, S. ¾ W., clears it to the westward.

The *Rive Rocks* lie off the N.W. point of Sanda, and dry at half-tide, extending out a full mile. With spring-tides the passage between the rocks and the shore completely dries.

FAIR ISLE* lies about E. ¾ S., 9 leagues from Dennis Head, and E. ¼ N., 10 leagues from the Start light. It extends N.N.E. ½ E. and S.S.W. ½ W., 2 miles, and is ½ a mile broad at its north end. The land of this island is very high, and the water, within ½ a cable's length of the shore, is deep. The only place where a vessel can moor, and that only in the summer-time, is a small cove on the east side of the island, called the North Haven, capable of containing only one or two small vessels at a time. Near the north end of this cove is a *rock*, always above water, on the north end of which you may make fast. There is a *rock* on the port side going in, which appears at low water; therefore you should keep in the middle of the passage. The least water in this cove is 12 feet. Mr. Thomas gives the latitude 59° 32′ 54″ north, and longitude 1° 37′ 50″ west.

It is high water at Fair Island about 10h. Ordinary spring-tides rise about 4 feet; extraordinary springs about 6, and neap-tides seldom more than 2 feet. The flood-tide commonly sets in from the N.W., dividing near the shore, on the N.W. part of the island, and running along the north and south ends of it, forms a large eddy on the east side. The channel between Fair Island and the Shetlands is about 20 miles wide; spring-tides run at the rate of from 6 to 7 miles an hour, but neap-tides not more than 2.

DIRECTIONS FOR SAILING THROUGH PENTLAND FRITH AND THE ORKNEYS.

The passage through the Pentland Frith is either between Duncansby Head and the south side of the Isle of Stroma, or, which is generally preferred, between the Pentland Skerries and the north side of that island. Your course and distance from the entrance of the Frith, to a fair berth between Stroma and Swona, is N.N.W. ½ W., 5 miles; and thence to the westernmost part of the Frith, between Dunnet Head on

* Notwithstanding this island is so small, rocky, and apparently barren, it is said to afford excellent pasturage for sheep, and contains a population of more than 200 people.

the coast of Caithness and Turn Ness, on Hoy Walls, N.W. by W. ½ W., about 9 miles; then running on W.N.W. ½ N. or N.W. by W., you will go clear of the Sule Skerry, Stack, and Nun Rock, on the starboard, and Cape Wrath on the port; but you should keep a good look-out for the latter danger, lying N. 32° E. from Cape Wrath, distant about 15 miles, the situation and particulars of which are given in page 63. Between the Frith and Cape Wrath, no place is adapted for the shelter or accommodation of a vessel in safety, better than Loch Eribol. Here the ground is clean. In going in, you will leave the Haa Island on your starboard side, and the Whiten Head on your port. This latter is a bluff point, of white appearance, making two ascents like steps. You may, near this side, run up to the Island Chorrie, where the anchorage is good, with 10, 12, and 14 fathoms, and large enough for numerous vessels, the best riding being athwart of two rivulets running from a hill on the west side of the loch.

With a neap-tide, the stream in Pentland Frith is generally so weak, that it will not carry a vessel much out of her direct course, and, therefore, it need not be regarded, unless there happens to be but little wind. The spring-tides, when strongest, run about 9 miles an hour, and therefore their strength, direction, and time of running, ought to be particularly observed in shaping your course. As the ebb-tide sets to the northward, and the flood-tide to the southward, it is necessary you should, in going to the westward with an ebb-tide, keep nearer to Duncansby Head and Stroma than to the Skerries and Swona; and in proceeding to the eastward with a flood-tide, you should keep nearer to Swona than to Stroma, unless the wind be scant in the southern quarter; in which case you should pass close by Stroma, in order to enable you to weather the Pentland Skerries.

As the tide runs nearly 3 hours longer in the middle of the Frith, than it does near the sides, ships in passing through it ought to avail themselves of that difference. If, for instance, when you come into the Frith from the southward, you find that the flood-tide is against you, your best way will be between the Caithness shore and Stroma Isle. In going through this passage, it is necessary for you to remember, that about a cable's length S.S.W. from the S.W. point of Stroma Isle, lies a *small rock*, which appears at about half-ebb; and also that from St. John's Head, in Caithness, a *rocky ledge* runs off N.N.E., called the *Men of Mey*, about ¼ of a mile. If the tide proves unfavourable to you before getting into this passage, you may obtain a temporary anchorage in Gill's Bay to the eastward of St. John's Head, on clean ground, and out of the tide-way, in from 3 to 6 fathoms.

As the tide, on its coming within ¼ of a mile of the middle of Stroma and Swona, divides into two branches, which, after passing their north and south ends, run to a considerable distance beyond the islands before they join again, ships that do not get through the Frith before the tide turns against them, may be kept under weigh in the eddies; or may, with a flood-tide, anchor on the east side of Stroma and Swona. About ½ a mile off the middle of Stroma you may anchor in 16 fathoms; the bottom being a mixture of sand and shells. The eddy here extends about a mile to the eastward of the island, where the two streams which form it unite again. About a cable's length off the North Haven, on the east side of Swona, you may anchor, in from 16 to 20 fathoms, in an eddy which extends about 1½ mile to the eastward, the bottom being generally smooth, although rocky in some places. From hence the water deepens very fast to the eastward. The North Haven is a narrow creek, or cove, near the northernmost house on the east side of the island of Swona.

Eddies are formed on the west side of Stroma and Swona, with the ebb-tide, which are as extensive as those formed on the east sides with the flood-tide, if not more so; but there is no anchorage on the west side of either island. Half a cable's length from the west side of Swona lies a *rock*, called the *Westerbow*, seen only with very low spring-ebbs.

Near the south end of Swona with a flood-tide, and also near to the north ends of Swona and Stroma with an ebb-tide, are *whirlpools*, but never dangerous to ships. From the north end of Stroma, westward, there is, during the ebb-tide, always a great swelling sea, and frequently breakers, even in the calmest weather. These are called the Swelky of Stroma, and ought to be avoided. From the south end of Stroma, westward, there is also, with a flood-tide, a rough breaking sea on the Men of Mey. Off Duncansby Head is likewise a rough breaking part of the sea, with spring-ebbs, called the Bore of Duncansby, often proving fatal to boats; but never so dangerous as the former.

In proceeding for Pentland Frith from the north-eastward, you must not approach Old Head on the east side of South Ronaldsha, within less than $\frac{1}{2}$ a mile; for Old Skerry lies about $\frac{1}{4}$ of a mile E.S.E. from the Head. You will clear this rock by keeping the north kirk of South Ronaldsha, or the house of Cara, in sight outside of Halcrow Head.

The *Lother* is a *rock* which lies off the south-west point of South Ronaldsha, and is never wholly covered but at high water; it may then be distinguished by the rippling of the tide, or the breakers on the middle of it. By keeping $\frac{1}{2}$ a mile from the shore of South Ronaldsha, when going to the westward with an ebb-tide, and a mile from the shore, when going to the eastward with a flood-tide, the stream will carry you clear of it. If you should be so near the land that you cannot go to the southward of it, you may safely keep the middle of the channel. Between it and South Ronaldsha, the water, though always rough and breaking, even in the calmest weather, is deep enough for any vessel.

Your courses through the Frith, between South Ronaldsha, Swona, and South Walls, on the north side, and Pentland Skerries, Stroma, and Dunnet Head on the south side, are as before-mentioned; but you must always allow for the operation of the tide: the flood setting to the southward, and the ebb to the northward. If you meet with the flood-tide before you get so far to the westward as the eddy on the east side of Swona, you may keep under weigh in Liddel's Eddy on the south side of South Ronaldsha. In keeping under sail in this, and also in all the other eddies, you must be particularly careful not to go beyond its boundary, lest you should be hurried away by the rapidity of the tide, and thereby be prevented from fetching into it again. The boundary is easily distinguished. This eddy, or westward stream, begins before it is half-flood on the shore, and extends by degrees southward. About the fourth hour of the flood, it spreads half-way to the Great Pentland Skerry, and near to the latter end of the tide it approaches within a cable's length of the Skerry.

There is an eddy also on the east side of Pentland Skerries, in which you may anchor with a flood-tide. The streams which form it do not join again, but become wider as they proceed, until they are lost in the open sea. About $\frac{1}{2}$ a mile S.S.E. from the Little Skerry are 14 fathoms. You may anchor in this eddy, with the following marks, viz.:—The middle of the Little Skerry on with the middle of the Great Skerry; or the east end of the Great Skerry on with Sandy Hill, in South Ronaldsha; or the west end of the Little Skerry on with the Hill of Hoy; and the east end of the Great Skerry on with the Wart Hill of Orfer. The ground is a mixture of sand and shells. There is also an eddy on the west side of the Skerries with an ebb-tide; but it is very small, not extending above $\frac{1}{4}$ of a mile from the Great Skerry.

About a mile S.E. from the east side of the Great Pentland Skerry, and $\frac{3}{4}$ of a mile E. by N. from the Little Skerry, lies Cleta Skerry. Its top is always above water. About half-way between Cleta Skerry and the Little Skerry, lies *Lotha Skerry*, a very *dangerous rock*, appearing at half-ebb. The water is shoal all the way from Cleta to the Little Skerry; but Lotha only appears above water.

NOTE.—In most of the eddies, especially those on the east side of Stroma and Swona Isles, you must be sure, with a spring-tide, to have your anchor up before the ebb begins to run, otherwise you will be obliged to cut or slip your cable, and afterwards find it very difficult to clear the island.

If, from the southward, you are crossing the east end of Pentland Frith for the Orkneys, with an ebb-tide, you should pass near to the west side of Pentland Skerry, to prevent your being carried by the stream to the westward of Swona, for there the ebb would be against you. In crossing from the north to the south, with a flood-tide, you should pass as near to Swona as you can, that the tide may afterwards be more in your favour. In crossing the east end of the Frith, either way, with a flood-tide, you should endeavour to get into the eddies of Stroma and Swona, in order to enable you to make use of the tide with greater advantage. When crossing Pentland Frith with the latter end of a tide, allow the stream to carry you as far as possible, as you will thereby have the greater advantage from the succeeding tide.

If coming from the westward, through the Pentland Frith, the lights will be useful when a ship is in the fairway; for by keeping them on the port bow or side, they will lead you to the S.S.E., into the North Sea.

When sailing along the east side of Deer Ness, be sure to keep more than $\frac{1}{2}$ a mile

from shore, as a *flat* runs off from the Kirk of Deer Ness, about ½ a mile E.S.E., which is almost dry with spring-tides. A little to the northward of the outer end of this flat, and S.E. from Sand Side, lies a *rock*, which is dry at half-ebb.

Stronsa Frith lies between Moul Head and the islands of Auskerry and Stronsa. It is 5 miles wide; and a N. by W. course will carry you in mid-way, clear of danger, until you get abreast of Greenholm Island.

In coming from the north-eastward, if mariners happen to fall in with Burrow, or Lamb Head, with an ebb-tide, and wish to go northward, they should steer N.E. by E., supposing the wind from seaward, until Dennis Head, upon which stands the new light-house and a beacon, with a ball on its top, bears on their lee-quarter, when they may vary their course as convenient. If the weather should be hazy, and you get near North Ronaldsha before seeing the land, then it will be prudent to go to the northward of the island, for both flood and ebb-tides will assist you in so doing; and having passed North Ronaldsha, and bound to the south-westward, be observant of the tides. In coming from the south-eastward, it will be proper to keep a good look-out for the Start light, when your course may be safely directed, steering by the direction of the light, and being careful to allow for the tides, because the ebb sets directly on Papa Westra, and the flood the contrary.

NORTH RONALDSHA FRITH.—In sailing to the westward, between Sanda and North Ronaldsha, with a flood-tide, you should proceed through the middle of the Frith, and the tide, if the wind fails, will carry you to the southward of the Reef Dike. If the ebb-tide is against you, in going through from the westward, you should keep as close to the shore of Sanda as the flats will permit, for there the stream is weakest, and may be more easily thwarted when occasion requires. If you happen to be near the south side of North Ronaldsha, and find it impossible to pass to the southward of Reef Dike, you may safely go through between Bride's Ness and the rock, by keeping about 2 cables' length from the Ness. If, when between the Reef Dike and North Ronaldsha, you be doubtful whether you can clear Dennis Head, especially with a flood-tide, you may tack, or come to an anchor in Lincelot Bay, on clean ground, rather than attempt going to the southward of the island, because there the flood runs directly towards and over the shoal.

There are many passages through the islands of Orkney, in which are a great number of excellent harbours; but, if you are not acquainted, it will always be advisable to take a pilot. In the Orkneys you may also procure a pilot for the adjacent coast and western islands of Scotland, the Irish Sea, Liverpool, Dublin, and the Shetlands.

THE SHETLAND ISLANDS.

Description of the Land, &c.

THE Shetland Islands run nearly in a N.E. by N. and S.W. by S. direction, the distance being about 60 miles from Sumburg, or Sumbro' Head, to Lamba Ness. The general appearance of the Shetland Islands is rugged, black, and barren, there being neither tree nor shrub to be seen. The coasts are commonly steep and precipitous, and the eastern shores comparatively low: but the western sides are lofty, ragged, and broken. The hills of Mainland are not remarkably high, but run in three ridges, Ronas Hill, at the N.W. corner of Mainland, appearing the highest. Vast detached *rocks* surround the islands, having the appearance of pillars; and the sea, in various places, has hollowed out arches and caverns in the rocks, of the most tremendous and magnificent nature. Fetlar island is supposed to abound with iron ore; and a rock there is said to affect the compass.

The EASTERN SIDE of the SHETLANDS. — Sumbro' Head is the S.E. extremity of the Shetlands. Upon this point, lying in latitude 59° 51′ 20″ north, and longitude 1° 16′ 27″ west, a lighthouse is erected, bearing from Hang Cliff Head, in Noss Island, S.W. ¾ W., distant 19 miles; from Fair Island N.E. by E. ¼ E., 21 miles; and from Foul Island S.S.E. ¼ E., 28 miles. In reference to these bearings, the light will be visible to the mariner from the south

ward, between Noss and Foul Islands, or from N.E. by E. $\frac{1}{4}$ E. round by the southward to N.N.W. $\frac{1}{2}$ W.

This is a fixed light, from oil, with reflectors. The lantern is elevated 300 feet above the medium level of the sea, and may be seen like a star of the first magnitude, at the distance of 6 or 7 leagues, in clear weather.

From Sumbro' Head to Mousa Island, the course is about N.E. $\frac{3}{4}$ E., and the distance 3 leagues; between them are several inlets, only frequented by small vessels in the summer-time. About 8 miles N.E. $\frac{1}{4}$ N. from Sumbro' Head is Cumla Ness, between Lewenwick and Sandwick Bays. Sandwick is on the eastern side, and sheltered by a rocky point, called No Ness: here is good anchorage, in from 12 to 4 fathoms, and there is the same depth in Lewenwick Bay; the shores of both bays are rocky.

To the north-eastward of No Ness lies Musa, or Mousa Island; this is about a mile long, and rocky. Between it and the main is a passage, leading to Aith Voe, having from 20 to 15 fathoms in it, called Mousa Sound.

Aith Voe is fit only for small vessels, having not more than 10 or 12 feet water in it; it is well sheltered by Haly Ness, between which also, and Mousa Island, is a good channel.

BRASSA, or BRESSA.—From Mousa Island to the Bard of Brassa, the course and distance are N.E. $\frac{1}{2}$ E., 7 miles. The entrance of Brassa Sound, which leads up to Lerwick, the principal village of Shetland, is easily to be known by the Islands of Brassa and Noss; the former is remarkably high in the middle, and goes sloping down to the westward; but to the eastward it ends in a perpendicular cliff. The Isle of Noss is to the eastward of Brassa, and has an acclivity from the west towards the east terminating with a high cliff that hangs over the sea, and therefore called Hang Cliff. Its situation is in latitude 60° 8′ north, and longitude (according to Mr. Thomas) 1° 0′ 30″ west.

BRASSA SOUND lies between Brassa Island and the main land. Its entrance is wide, and free from danger; but as you advance, it narrows, being between Kirkoby Ness and Nab Point, not $\frac{1}{2}$ a mile broad; farther on, between the land of Hogan and Rovey Head, it becomes still narrower; the distance there from land is scarcely 2 cables' length; nevertheless the channel between is clear of danger, and has a depth of 3 and $2\frac{1}{2}$ fathoms. Off Kirkoby Ness are *some rocks* under water; and on the opposite side, called the Nab Point, are others which must be carefully avoided. On the port shore stands the town and castle of Lerwick, in latitude 60° 9′ 22″, and longitude 1° 8′ 41″ west, built on the rocks, before which is good anchorage, in 8 or 10 fathoms. This is the principal town in the Shetland Islands; its population is computed at about 2,000; it carries on a considerable trade, and is the chief rendezvous of vessels employed in the adjacent fisheries. Near the north end of the town stands Fort Charlotte. It is high water at Lerwick, full and change, at 10h. 30m. Spring-tides rise 6 feet, neaps 4.

North Shoal Buoy, entrance to Lerwick.—A 7-feet buoy (black), was in 1848, laid down in $2\frac{1}{2}$ fathoms, with Northness House, mainland, S. by W. $\frac{1}{8}$ W.; north end of Grimster House N.W. $\frac{1}{2}$ N., and Hogan fishing-house, Brassa, N.E.

To the N.N.E. of Lerwick Castle, about $1\frac{1}{2}$ mile, is the *Loofabar Rock*, with only 3 feet water on it. It lies nearly in the middle of the channel, and W. by S. from the Holm of Cruister. Close to it are 3 fathoms; and between it and the port shore, 5, 6, and 7 fathoms. This is the best and most proper channel for all large vessels; for between the Loofabar and the Holm of Cruister, the water is shallow, there being only 2 fathoms midway. Between the Holm of Cruister and the starboard shore, is a narrow passage for boats, with 3 and 4 feet in it. The port shore is rocky. From Lerwick round North Ness, towards Skibdock and Greymister, the shore is also rocky. At Greymister is a *sandy beach*, where you may get fresh water. About $\frac{1}{3}$ of a mile N.N.E. from Loofabar, is a *patch*, with only 9 feet water on it, and near Rovey Head lie two small islands. A *sandy spit* runs out from the Point of Hogan; and between it and the opposite shore are $2\frac{1}{2}$ and $3\frac{1}{4}$ fathoms, deepening as you advance towards Green Head, to 4 and $4\frac{1}{2}$ fathoms. Here the navigable channel is very narrow; and thence, northward, to 6, 9, 12, and 23 fathoms, off Rovey Head. In going to the northward from Lerwick, you should not venture without a pilot.

CATFRITH VOE is the general name for the entrance to four places of good anchorage, called the Four Voes, or Deal Voe, Laxfrith Voe, Wadbister Voe, and Cadfrith Voe. They are all clean, and have good anchorage; but, in your way towards them, on the port side, are a number of *dangerous rocks*, which render the approaches to Deal Voe very difficult. E. by S. from Hawk's Nest, $\frac{2}{3}$ of a mile, and south from Glitness Island, distant $\frac{1}{2}$ a mile, lies the *Unicorn Reef*, with only 6 feet on it; bring the south end of Glitness N.W. by W. or W.N.W., and steer for it. Passing near it, you will soon open Catfrith Voe to the northward of you, and may enter Catfrith in safety. At the entrance of Wadbister Voe is a *patch* of 9 feet, with a good channel on each side of it; and nearly a mile above this you will have 11 or 12 fathoms water, and be well sheltered.

The main land from behind Glitness to Eswick, is all steep and rocky; but off the Mull of Eswick, is the How Stack, a small green island, lying S.S.W., nearly a mile from the Mull. N.E. by N. from Eswick Mull, distant $2\frac{1}{2}$ miles, is Hog Island, with *some rocks* to the eastward of it. To the northward of Hog Island is Stava Ness, between which and Dragon Ness,

is the entrance to Oure, or Doury Voe. This is a large and safe bay, running in full 3 miles to the westward, and having several places of good anchorage within it. On the southern side is Ballester Holm, and beyond it *some sunken rocks;* and farther to the westward is Swarta, or Black Islet. It is advisable to sail near the northern or starboard shore, which is free from danger, with from 22 to 10 fathoms water. Directly before the entrance to Doury Voe lie the Whalsey, and other islands, with channels between them; but they are very dangerous, and little frequented except by the natives. The southern ends of the Whalsey are encumbered by *rocky reefs;* and there are *three rocks*, called the *Rumble*, *Grief*, and *Eastling*, and Four Holms of Isbister, lying considerably out to the eastward of the Whalsey; these are all above water, with passages between each other, and also between them and the Whalsey.

Between the Mull of Eswick, and the S.E. part of Whalsey Island, are the following *rocks*, which lie from 2 to 3 miles from the main land, viz.: — The *Hoga Baas*, *East Fladdecap*, *West Fladdecap*, *Little Billian*, and the *Outer*, *Middle*, and *Inner Voder;* all of which have channels between them, of from 20 to 30 fathoms water. The Outer Voder lies E. by N. $\frac{1}{2}$ N., $1\frac{1}{2}$ mile from the Mull of Eswick, between which lie the Inner and Middle Voder. Little Billian lies E. $\frac{1}{2}$ N., 2 miles from the Mull; a mile E. by N. $\frac{1}{2}$ N. from which lies the West Fladdecap; and a mile farther, in the same direction, lies the East Fladdecap. The Hoga Baas lies $\frac{1}{2}$ a mile from the S.E. part of Whalsey, having a channel of 30 fathoms water between them. *Two rocks*, above water, lie off the north-east end of the Whalsey: the outer one is named the *Skaw Holm*. The south end of Whalsey Island lies N.N.E. $\frac{1}{2}$ E., nearly 11 miles from Hang Cliff, the island being $4\frac{1}{2}$ miles long, and 2 broad.

OUT SKERRIES.—East, about $3\frac{1}{2}$ miles from the north end of Whalsey Island, and N.E. $\frac{1}{4}$ E., 17 miles from Hang Cliff, lie the south end of a small cluster of Islands, called the Out Skerries. In the centre of the three largest islands, named Housay, Gruna, and Brury, there is good anchorage for small vessels; but a pilot is requisite. *Several rocks* lie to the southward and westward of them; but they all appear above water. N. by W. $\frac{1}{2}$ W., $2\frac{1}{2}$ miles from the south end of Houray lies the *Muckle Skerry*, or *Great Rock*, which is always above water. Midway between the Muckle Skerry and the islands off the south end of the Outer Skerry, lie the Little Skerry and Vong Islets, both surrounded with *rocks*. N.W. by W. from Muckle Skerry, about $5\frac{1}{4}$ miles, lies Lunna Holm, forming the southern point of entrance to the Sound of Yell.

Between Doury Voe and Lunna Holm, is Vidlon Voe, which runs to the southward, and forms a good harbour in case of necessity, with deep water. Along the main land from Lunna Holm, westward, are numerous voes, or inlets, with excellent harbours. Numerous islands also lie scattered about this part, around which are good and safe passages, with deep water.

About 2 miles N.E. by N. from Lunna Holm, lies the south-eastern point of Yell Island. Some *rocks* lie off to the eastward, which must always have a berth given to them in passing. To the westward of this point is Burra Voe, and a little farther Hamma Voe, both having good riding for small vessels; but the latter place is most commodious, and much to be preferred.

YELL ISLAND lies in a N.N.E. $\frac{1}{2}$ E. and S.S.W. $\frac{1}{2}$ W. direction, being about 15 miles long. On its eastern side are Refrith and Basta Voes, two havens, with good anchorages, where vessels may ride in perfect safety; indeed, Basta Voe may be considered one of the finest harbours in Shetland. Off the entrance to Refrith Voe lies the Island of Hascosea, and between it and the eastern point of the voe, there is a *rocky islet*, of small dimensions, called *Hascosea Baa*, with 7 fathoms water around it. The best passage into the voe is to the southward of the Baa.

FETLAR ISLAND lies to the eastward of Hascosea, nearly a mile, the channel between them being named Colgrave Sound. Fetlar is a square-formed island, measuring about 5 miles from east to west, but not so much from north to south. On its southern side is Tresta Bay, open to the southward, and otherwise shoal and dangerous. At its eastern side is Funzie, another small haven, of no note. From thence the shore is steep and rocky to Strandburgh Ness, the N.E. part of the island. To the westward of Strandburgh Ness is Gruting Bay, which is extensive, and free entirely of danger, with from 5 to 15 fathoms water in it; but it is open to the north-eastward.

UNST ISLAND lies directly to the northward of Fetlar Island, its south-eastern point being N. $\frac{1}{2}$ W., distant 4 miles from Strandburgh Ness. This island is about 10 miles long, and 4 miles broad, lying in a N.E. and S.W. direction. At its southern end is Skuda Sound, a safe and good haven, formed between the islands of Unst and Uya Islands. Off the southern end of Yya Island is Wedderholm Island surrounded by *rocks* near its shores; but the passage between it and Uya is clean, though narrow, and has 4 fathoms water in it. Haaf Grunie Island is to the eastward, and has a *sunken rock* off its northern end, which, although there is sufficient water over it at all times, and consequently is not dangerous, yet, in a gale of wind, the sea frequently breaks over it. There is a hill, called Vallafield, which rises rather more than a mile from the northern extremity of Unst, and extends parallel to the western shore. It is 697 feet high. At right angles with this hill stands Crossfield, nearly in the middle of the island. To the north stands Saxavord, about 938 feet high. This is the loftiest mountain, and

may be seen 40 miles off in clear weather. Vorid, or Vord Hill, runs in the direction of the eastern coast. Among these hills are several tracts of level fertile ground; and the highest hill is covered with a sort of black moss. The headlands rise to the height of 60 and 70 fathoms; but the shores of the bays are low and sandy. Round the island are several curious caves; and under Saxavord Hill is a magnificent arch, 300 feet in length, and of considerable height, through which a boat may easily pass. The N.E. end of Unst is called Lamba Ness, in latitude 60° 49′ north, and longitude 0° 45′ 30″ west.

The VEER REEF is a nest of *rocks*, lying to the north-eastward of Mu Ness Point, distant a mile, over which the sea constantly breaks. Off Mu Ness Point is a *reef of rocks*, under water; it will, therefore, be requisite to give the point a good berth. Ham Creek lies behind Mu Ness Point, where a small vessel may ride, in 10 feet water.

BALTA SOUND is situated between the islands of Balta and Unst, the south point of the island, being in latitude 60° 44′ 30″ north, and longitude 0° 48′ west. There is a small island to the westward of the south end of Balta, called Hunie, or Hoony; but no passage between it and Unst, except for boats, at high water. The entrance between Hoony and Balta is easy, and clear of danger, having from 15 to 16 fathoms in it. You may know this place by the flagstaff on the island of Balta; and when within, you will find the inner part of the harbour very commodious and secure. Here are several convenient beaches, where your vessel, if leaky, may be thoroughly repaired.

In summer, vessels intending to go out by the north passage, frequently run in here, and anchor, bringing Mr. Edmonstone's large house on with a small house standing on the southern point of the inner harbour, bearing about N.W.; and the east point of Fetlar open of the S.W. point of Balta Island. The passage to the northward of Balta between it and Sweence Ness, is narrow; and Balta north point has a *rocky reef* adjoining it, which renders this northern passage somewhat dangerous. It is high water in Balta Sound, full and change, at 9h. 45m.; springs rise $6\frac{1}{2}$ feet, neaps 3.

Balta Sound buoy (north entrance).—A 7-feet buoy (black), has been moored (in 1848) in $4\frac{1}{2}$ fathoms, with Sweenee Point bearing E.N.E. $\frac{1}{4}$ E.; Sheepfold in middle of centre hill of Balta, bearing S.S.E. $\frac{3}{8}$ E., and Midgarth House, in Unst, N.W. by N. $\frac{1}{2}$ N.

The WESTERN SIDE of the SHETLANDS.—Seat Ness is a mile to the westward of Sumbro' Head. Between them the land bends in to the northward, forming a bay, called West Voe, in which vessels may ride, in 6, 7, and 8 fathoms; but this place is unsheltered, and completely open to the southward; yet it may often be convenient to run in here, when Quendal Bay would be too open; for there will be no difficulty in beating out of it unless the wind should come round to the southward. Off Seat Ness lies Horse Island, which is the southernmost land of all the Shetlands. N. by W., a mile from Seat Ness, is Cross Island; between which and the main is a passage, but very dangerous, on account of the *sunken rocks* within it.

QUENDAL BAY.—The entrance to this bay is to the northward of Cross Island, by which it is somewhat sheltered. Steer in mid-channel, and you will find good anchorage at the west side of the bay, in 6, 7, and 8 fathoms water. Here you will ride safe, and secure from all but S.S.W., S.W., and W.S.W. winds. To the northward is Fitfil Head, a lofty promontory, 929 feet high, about $4\frac{1}{2}$ miles distant from Sumbro' Head. Fitfil Head is steep, and without any hidden danger. Having rounded this, you will see Colsay Island, lying directly opposite to an inlet, where there is deep water and good anchorage. Beyond it is St. Ninian's Island. Between its northern end and the main, vessels may find occasional shelter, riding in from 5 to 8 fathoms; but in the middle of the entrance is a *patch*, with only $3\frac{1}{4}$ fathoms on it, having a good channel on either side.

CLIFF SOUND.—To the northward of St. Ninian's, and between it and the Halvera Islands, is a passage into Cliff Sound. Its entrance is nearly a mile wide, with 25 fathoms mid-channel, free from rocks or dangers, except some sunken ones close to Maywick Holm. These you will leave to your starboard. On your port side is the long narrow island, called East Burra. Beyond this is the lesser island of Trondra. West Burra Island lies to the westward of East Burra, and runs nearly in a parallel direction to it. A small island lies off its western side, which is joined to Burra by a *reef of rocks*. There is no passage between them. To the northward are Oxna, Papa, and Channes Islands, the former having *numerous rocks* about it. To the eastward of these are *three rocks*, above water; and two small islands, called Greenholm and Merryholm. Longa and Hildasay are to the northward; and several barren *rocks*, called *Sandistur Holms*, are to the northward of Hildasay, extending N.N.E. $\frac{1}{2}$ E. and S.S.W. $\frac{1}{2}$ W., nearly $1\frac{1}{2}$ mile. Bragin, another barren islet, lies between Hildasay and Skelda Ness. These islands and rocks have deep water all round them; and there are passages between most of them to the different voes, or inlets, situated at this part of the main land. Through Cliff Sound small vessels commonly pass to Scalloway; but there is a bar between Trondra and the main, which can only be crossed at high water, it then having 2 fathoms over it. Scalloway is a village, next in consequence to Lerwick, and, though small, has an ancient castle, in latitude 60° 8′ 31″ north, and longitude 1° 16′ 25″ west.

The best passage to Scalloway is between the islands of Burra and Oxna, Greenholm, and Merryholm, and is called the south channel. The middle passage is to the northward of Oxna

and Channes, and to the southward of Hildasay and Longa. The northern passage is to the northward of Hildasay and Longa, and between them and Bragin Reefs, and the rocks of Sandistura. In each of these there is a good depth of water. The course and distance from off Fitfil Head to the entrance of Scalloway, by the south channel, are N.E. by N., 12 miles; then bringing the castle E. ½ N., it will appear just open to the southward of Green Island, which is high and round. This mark will lead between Green Island and the small island called Merryholm, leaving the latter on the starboard side. In passing between these islands, keep nearer to Greenholm. Run in boldly, and anchor before the town, in 4 or 5 fathoms. It is high water, full and change, at Scalloway, at 9h. 30m.; springs rise 5¾ feet, neaps 3¼.

Skelda Ness lies from Fitfil Head N. by E. ¾ E., 14½ miles. It is bold-to and rocky. N.N.W., 1½ mile from Skelda Ness is Gilderumple, a point of land, surrounded with *several rocks*, both above and under water. In the same direction, 2½ miles farther is Vaila Island.

VAILA SOUND is situated behind Vaila Island, having a channel into it on either side. The passage on the southern side is called the East Sound, and leads to Gruting Voe, a place of excellent anchorage. That on the northern side of the island is called the West Sound, and leads into Vaila Island Sound. The Eastern Sound is clear, and free from danger; but a *sunken rock* lies in the midway of the West Sound, which should be avoided; although there is water enough for a small ship to pass over it with safety. *Several rocks* also lie near the north end of Vaila Island, chiefly above water; but there is a *blind rock* near one of the islands, which, by steering near the main, you will readily go clear of. This place is considered one of the best anchorages on the western side of the Shetlands.

From Vaila Islands the coast runs nearly N.N.W., 3 miles to Watts Ness; and thence N.N.E., 3½ miles, to Sand Ness. Sand Ness is the westernmost point of the main land, and forms the starboard point of entrance of Papa Sound. Papa Stour Island is the port or northern boundary of the Sound, which is full of *dangerous rocks*, and never to be attempted without a pilot. Should you be obliged to enter the Sound without one, keep in mid-channel, in 9 and 10 fathoms. The course through is E. by S. and W. by N. The *Midsound Bass*, with 9 feet on it, lies on the south side of the Sound, about half-way through. N.W. by N. from Papa Stour, distant about 3 miles, are the *Ve Skerries*, *two rocks* above water, surrounded by others under water. They should not be approached too near.

ST. MAGNUS BAY is that extensive space between Papa Stour and Esha Ness. In it are numerous voes, or inlets, with good anchorages, particularly at Unzie, or Oni Frith, which lies to the south-westward of Vementry Islands; also at the voes behind Muckle Roe Islands; and at Hillswick and Sandwick to the northward; but the best place to run into, with south-westerly gales, is Hillswick, or Hamer's Voe, in the N.E. part of the bay. The best anchorage in Hillswick Frith for a large ship, is with Magnus Kirk bearing N.W., in 6 fathoms. Smaller vessels may run up towards the head of the bay, into what water they choose, by keeping mid-channel. The south extreme of Hillswick Ness is in latitude 60° 27′ 10″ north, and longitude 1° 30′ 14″ west. It is high water, full and change, at 9h. 45m.; springs rise 6½ feet, neaps 3¼.

ESHA NESS is a rocky point of land, which bends out to the south-westward, and has a rocky island near it, called Sarla Holm. From hence the coast runs north-easterly 2 miles, to Hamna Voe, a little inlet, fit only for small craft. N. by E., about 2½ miles from the entrance of Hamna Voe, is the *Ossa Skerry*, a remarkable lofty *rock*, above water, with *several rocks* near it, and serving as a beacon for this part of the coast. From Hamna Voe the coast runs nearly N.E., 2 miles, to Ockren Head; and then turns easterly, towards Ronas, or Rooeness Voe. This is a large inlet, opening south-easterly, and extending inward full 4½ miles. There is good depth of water and anchorage within it. When 3 miles within the entrance, this voe turns suddenly to the eastward for nearly 1½ mile, having from 19 to 12 fathoms water, until you are near the head of the voe: here you will be land-locked, and sheltered from all the winds. A little inland, to the northward, is a remarkable hill, called Ronas Hill, or the Blue Berg. It is, at its summit, 1,476 feet above the level of the sea, serving as a land-mark for mariners. On its summit is what is called a watch-house, constructed of four enormous stones, and covered with two others, upon which a small pyramid, of lesser stones, is formed. Not far distant is a *remarkable rock*, rising perpendicularly on all sides, and appearing like a vessel under sail; and near it are two very high and inaccessible pillars, on which the cormorants breed.

The shore, all the way from Esha Ness to Fethaland Point, is steep and rocky. Between Ronas Voe and Fethaland Point, a rocky islet lies a little way from the land, called Uya Baas, having a *shoal*, of 4¼ fathoms, near its N.E. side; and there is a passage between it and the main. At 2 miles beyond Uya Islet is Sand Voe, another inlet, with convenient anchorage for small vessels.

Fethaland Point is the northern extremity of the main land of Shetland, and is distant from the entrance to Rooeness Voe about 8 miles. Off it lies Greenholm: and farther to the northward are two *large rocks*, above water, called *Romna Stacks*. Between these and Yell Island, to the eastward, is the northern entrance to the Sound of Yell.

Whalfrith Voe on the isle of Yell, has anchorage within it; but its starboard point of en-

trance (named Graveland Ness) is *rocky* a considerable way out. It should be remarked, that it will be difficult to sail out of this place with a westerly swell; and consequently it is inconvenient, and not recommended. Gloup Voe is on the northern side of the island, and open to the north winds: there is, nevertheless, anchorage, with from 5 to 2 fathoms clean ground; but it is little frequented.

Between Yell Island and Unst is Blumel, or Blue Mull Sound. The shores on both sides are *rocky;* and vessels, if occasion requires, may with care pass through it with safety; but there is always a strong current.

Burra Fiord is an inlet, on the north part of Unst, with some rocky islets before it, called the Burra Fiord Holms. There is anchorage within it; but it being so open to the northward, is little frequented. Off the north-eastern part of Unst is a rocky islet, called the Scaw.

FULO, or FOUL ISLAND (more properly Fowl Island, from the numerous birds which resort there), is the westernmost of the Shetland Islands, the summit lying (according to Mr. Thomas) in lat. 60° 8′ 18″ north, and lon. 2° 5′ 40″ west. Its S.E. point lies N.N.W. $\frac{1}{2}$ W., about $23\frac{1}{3}$ miles from Fitfil Head. W.N.W., 18 miles from Skelda Ness, and nearly S.W. by W. $\frac{1}{4}$ W., 25 miles from Esher Ness. It runs in a N. by E. and S. by W. direction; is $2\frac{1}{2}$ miles long, and $1\frac{1}{4}$ mile broad, being *foul* all round; but more particularly at its northern part, where a *reef of rocks* runs off a full mile, called the *Friar's Rocks*. There is but one place of landing, which is at Ham, on its eastern side. It is considered of some importance, and much resorted to by fishermen. This island is 1,369 feet high, and may be seen from the Shetland Islands; and also, in clear weather, from the Orkneys; the cliffs on its western side being elevated 1,000 feet above the sea, while its eastern part slopes down in some places quite level with the edge of the water.

HAVRE-DE-GRIND.—To the south-eastward of Foul Island, distant 2 miles, lies the *Havre-de-Grind Rocks*, which occupy a considerable space, and have on their shoalest part only 2 feet over them, at low water, spring-tides. These rocks bear from Fitfil Head N.N.W., distant 22 miles; from Skelda Ness W. by N. $\frac{3}{4}$ N., 16 miles; and from Foul Island south point E.S.E., 2 miles. Between them and Foul Island are soundings, of 20 and 25 fathoms; around them, 5 and 6 fathoms; and between them and the main land, from 25 to 46 fathoms.

SAILING DIRECTIONS FOR THE SHETLAND ISLANDS.

BRASSA, or BRESSA SOUND.—To sail into Brassa Sound from the southward, you should endeavour to go in mid-channel, running in without fear, for the shores are bold-to. Bring the two points of land which are to the southward of Kirkoby Ness on with each other, and you you will pass the reef that runs from Kirkoby Ness, and to the eastward of that which stretches from the Nab; or keep in mid-channel, until you perceive the Castle of Lerwick; when, being in 8 fathoms, haul up to the westward, and anchor before the town, in 8, 9, or 10 fathoms; or run on farther northward, taking care to avoid the *Loofabar Rock*, which lies in mid-channel, with only 3 feet water over it; and anchor between it and the shore, in 6, 7, or 8 fathoms, on good holding ground. This harbour is capacious, and capable of containing a fleet, well sheltered from all winds. Large rings are fixed in the rocks for your cables to be fastened to; so that you will have no occasion to moor with 2 cables, as heretofore.

To sail out through the North Sound, keep near the main land, which is bold, until you have passed the Loofabar; then give a good berth to Hogan Point, because a *sandy spit* stretches out from it. There is also a *middle ground*, of 9 feet water, hereabout, with a channel on each side of it, that on the western side having the deepest water; keep therefore about $\frac{1}{3}$ of the width of the passage from the main, and pass through the Narrows, where you will not have less than $2\frac{1}{2}$ fathoms water; and after you have passed the Narrows, steer out E. by N. or E.N.E, between the islands of Bcoster and Greenholm, leaving the *sunken rocks*, which lie off the latter, on your port hand; but as this passage has not sufficient depth of water for any ship drawing more than 16 feet, it will not be prudent for strangers to attempt going through without a pilot.

Between Brassa and the Mull of Eswick, is the inlet of four harbours, or voes,—Deal's Voe, Laxfrith Voe, Wadbister's Voe, and Catfrith's Voe. They are all clean, and have good anchorage. Deal's Voe runs in W.S.W., about 2 miles, and has good anchorage, in from 10 to 5 fathoms, being the southernmost of the four voes; and its approaches from the sea are rendered difficult, in consequence of *several sunken rocks*,

which lie at a distance from the land. *Unicorn reef*, with only 6 feet water on it, lies south, ½ a mile from Glitness Island; and E.S.E., ⅔ of a mile from Hawk's Ness. The best passage in, is between Unicorn Reef and Greenholm Island. You will have the voe open when Glitness bears N.W. by W., 1 or 1¼ mile. You may then steer W.S.W. directly for it, leaving the Unicorn Reef and Hawk's Ness Baas on your starboard; and the Greenholm, Nive Baas, and Brethren Rocks, on your port hand. The channel is nearly a mile wide. When coming from the eastward for Catfrith, Wadbister's, or Laxfrith Voe, bring the south point of Glitness Island to bear from N.W. to W.N.W., when you may steer for it, passing near its south end, to avoid the Unicorn Reef. You will now have Laxfrith Voe open, and may run in S.W. by W., and anchor in 6 or 7 fathoms; or continue on to the north-westward, ¾ of a mile past Railsborough Ness. You will now open Wadbister and Catfrith Voes, the former running in west, about a mile, and the latter, N.N.E., the same distance. This is an excellent harbour, and capable of containing 100 sail. In the middle of the entrance to Wadbister's Voe is a *patch*, of 9 feet, with a channel, of 6 to 9 fathoms; by keeping towards either shore, you will avoid it.

Vessels coming in for these voes from the northward, and having passed the Outer Skerries* to the eastward, should haul in W. by S. ½ S. for Rumble Holm; and passing a mile to the southward of it, a W. ½ S. course, 7 miles, will bring you to the *How Stack*, a *high round rock*. Take care you do not bring the Stack on a west bearing when approaching it from the north-eastward, for the *Snacka Rock* bears east from it, ¾ of a mile; and when Glitness Islands bear W.N.W., steer towards it, as before directed. When coming from the southward, bring Noss Head S. ½ W., and How Stack N. ½ E.; run with these marks until Glitness bears N.W., you may then steer towards it as before.

SOUND OF YELL.—To go through the Sound of Yell from the southward, you should pass to the eastward of Whalsey Island; for the passage between it and the main is encumbered with rocks and islands, and considered difficult and dangerous. A N.N.W. or N.N.W. ½ W. course will take you clearly through between Whalsey Island and the Out Skerries; and when abreast of Luna Holm, the Sound will be open, and you may take any channel between the islands that may be most convenient. The water is very deep, and 30 or 40 fathoms will be found very near some of the islands in the Sound. To sail between Yell and Unst Islands from the southward, you may pass between Hascosea and Fetlar, through Colgrave Sound, or between Fetlar and Unst. The direct course through the former is N.N.E., which will carry you to the island Longa. You may leave this island either to the eastward or westward; and having done so, a N.N.E. ½ E. course, nearly, will take you through the Sound of Blue Mull. Here the current is very strong. A good attention to the tides, and great care is requisite to guard against its effects. To go to the northward of Fetlar, you must pass between Haaf Gruna and Fetlar Islands. A W.N.W. ½ northerly course will take you clear of these islands, southward of Wedderholm. You will have 3 or 4 fathoms a cable's length off; and take especial care you are not driven by the tide too near the islands at the N.W. end of Fetlar; for the ground, all about Longa, Guna, and Dau, is *foul* and *rocky*.

BALTA SOUND, although not so large, is in some respects equal to Brassa, and has in the shoalest part from 6 to 8 fathoms. The southern entrance between Hunie and Balta Islands is easy, and clear of any danger, having from 12 to 16 fathoms in it. Captain Ramage, who surveyed this harbour, states, that "a stranger having the chart, may boldly run in, only keeping Hunie Island on the port hand, and Balta on the starboard. Should a southerly gale raise much sea between the islands, set lofty canvass, seaman-like, keep the jib up, and steer directly between them. Here a pilot will come on board; but should that not be the case, shorten sail, and, according to the wind, run to the first place of anchorage marked on the chart, keeping the eastern part of Fetlar Island open of the south end of the Balta." In making the harbour of Balta, or the Bay of Uya, on the south side of Unst, the tide should be particularly attended to, more especially if you intend attempting the northern passage. In shifting from Uya to Balta, it will be necessary to make use of the latter part of the flood and the first of the ebb; since, without the first of these, it will be difficult to beat out of the Bay of Uya; and without the last, equally inconvenient to beat into that of Balta.

---

* A lighthouse is projected on the outer Skerries.

If desirous of going from Balta Sound, or Uya Bay, to Cloup Voe, or the western parts of Yell Island, it is requisite to understand, that the passage round the Scaw, in the former case, or that of Blue Mull Sound, in the latter, are inexpedient, and even, on certain occasions, dangerous; so that it will be more advisable to take the southern passage through Yell Sound. The strength of the current through Colgrave Sound, within Fetlar, though far less than the stream which runs with such velocity through Blue Mull Sound, renders it also necessary to be well acquainted with the times of the ebb and flow through that passage, no less in merely sailing through it, than in attempting to make the harbour of Basta Voe.

In passing round the Scaw and Lamba Ness, a knowledge of the tides is absolutely necessary, for their strength is very great; and it is requisite to take advantage of both ebb and flood, on rounding these headlands. The whole of the flood or ebb is equally required to make your passage from Fethaland to Hillswick, or from Papa Stour to the southern harbours of Aethsting. The same observation applies to all the harbours on the western shores of Shetland; and a miscalculation of the time or velocity of the current, especially with scant wind and a-head sea, may be productive of serious dangers and inconveniences. The shores on the east side of the Shetlands are very steep; you will generally have from 40 to 50 fathoms within a league of the coast, and 5 or 6 miles off, there will be 120 and 130 fathoms.

QUENDAL BAY.—To the N.W. of Sumbro' Head lies Fitfil Head. Between these is Quendal Bay. The course in is N.E.; and you may get anchorage on the western side of the bay, in 6, 7, or 8 fathoms, where you will be sheltered from all winds, except those from the west to S.W. The passage between Cross Island and the eastern shore is foul and dangerous.

SCALLOWAY.—The entrances to Scalloway are four:—through Cliff Sound, between East Burra and Tronso Islands, and the main land; through the South Channel, or between West Burra and Merryholm, on the one side, and Oxna, Papa, and Green Island on the other. In the Middle Channel, or between Channes and Papa, to the southward, and Hildasay and Longa Islands, to the northward; or the North Channel, between Haldasay and Sandistura, and to the northward of Longa.

To sail through Cliff Sound to Scalloway, you will leave Halvera Islands on your port side, and St. Ninian's Islands and Maywick Holm on your starboard side, steering in E.N.E., and keeping nearer to East Burra Island, until you bring Tingwall Kirk to bear about N.E., touching the east side of Tronda Island; run on with this mark as far as the south end of Tronda Island, then haul over to the eastern shore; and at the north end of Tronda, a *sandy bar* runs across, which, at high water, has 2 fathoms over it; you will, therefore, wait the proper time to go over it, and turning round the north end of Tronda, anchor abreast of Scalloway Castle in 4, 5, or 6 fathoms. This is a safe and secure harbour, well sheltered from all winds, and the ground clean and sandy.

To sail through the South Channel, which is considered to be the best and safest, bring Scalloway Castle to bear E. $\frac{1}{2}$ N., it will then appear open to the southward of a high round island, called Greenholm, and will carry you between it and Merryholm, which is a small island, to be left on your starboard side. In sailing up this channel, you will have from 20 to 5 fathoms. Between Green Island and Merryholm there are only $3\frac{1}{4}$ fathoms near the latter; therefore, keep nearer to Green Island; and 7, 6, and 5 fathoms, as you advance towards the anchorage before Scalloway.

To sail through the Middle Channel, bring Scalloway Castle to bear E.S.E. $\frac{1}{4}$ S., and pass near to the north end of Channes Island; and then steer S.E., $\frac{3}{4}$ of a mile, towards Greenholm Island, in order to pass to the southward of a *patch of foul ground*, with only 5 feet on it, which lies in mid-channel. As soon as the south end of Longa Island bears E. by S., distant $\frac{1}{2}$ a mile, steer more towards it, giving the end of the island a berth of a good cable's length in passing; then edge over to the northward a little, and pass between the three rocks and Greenholm on one side, and the main land on the other; round the western point of the latter, and steer up channel for the anchorage.

To sail through the Northern Channel, bring Hildasay Island to bear about east; but be careful not to advance too near the island, on account of the *ledge of rocks*, which runs off its S.W. end. Having completely cleared the north end of Hildasay, turn round to the east and south-eastward, going to the eastward of Longa, and between the three rocks and the main, as before described.

VAILA SOUND.—To sail into Vaila East Sound, which is the best and widest

channel, if the wind be from the W.S.W. or S., steer for the S.E. end of Vaila Island, which is high and bold-to. There is an old Pictish castle built on the high land opposite, which forms a very remarkable object to know the entrance by. On the starboard side is Flass Island, a *bold barren rock*, which you will pass to the westward of, and steer N.N.W. toward Vaila Sound; this will carry you mid-channel, in from 15 to 4 fathoms water, which is in the narrowest part of the channel. Here you will see the Island of Longa dividing the Sound into two parts. The channel between Longa and the main, or White Ness, is the narrowest; at its entrance is a *rock*, above water, lying nearly in the middle of the channel. At the farther end of the creek stands a kirk, and near it the minister's house; bring this kirk to bear N.N.E., and it will carry you up the inlet, and to the eastward of the rock: let the same kirk bear N.E. by N., and you will pass to the westward of it. There are 9 fathoms at the entrance, 8 and 6 as you advance up, and thence shallowing toward the end to 2 fathoms.

To sail in by the West Sound, you must take particular care of a *rock*, which is situated directly in the middle of the entrance; the passage in is not above $\frac{1}{8}$ of a mile wide; an E. by N. course will take you to the southward of the rock: an east course will carry you to the northward of it: this latter is the better passage of the two. There is water enough for a small ship to pass over this rock, though the sea breaks over it; but all around is deep water. Having passed on either side of this rock, edge over to the main, to avoid a *blind rock*, which lies opposite to a building on Vaila Island, standing near the water's edge; it is nearer the south shore, not far from Limekiln Rock, and should be left on your starboard side. When you have passed the three islands on your port side, you will open Vaila Sound, and may haul over to the northward, and anchor. The rocks which lie off the north end of Vaila Island, render this passage not so safe as the eastern one.

GRUTING VOE.—If you intend going into this place, you will proceed, as before directed, for the East Sound, steering boldly in between Flass and Vaila Islands; but instead of turning towards Vaila Sound, steer for Green Head, for the opening or entrance to Gruting Voe cannot be seen until you are near the peninsula of Green Head. Haul boldly round the head; for though the channel in is but narrow, the water is deep, having 18 and 20 fathoms mid-channel. When past the narrow strait, it becomes wider, the course up it being about N.E., easterly. Here is excellent anchorage, with from 14 to 3 fathoms, gradually shallowing as you advance; at the farther end of the Voe is Gruting Holm. To the starboard are two narrow voes, called Olas Voe and Selie Voe, fit only for small vessels. Bruland Voe terminates this inlet, and has anchorage, in 3 and 4 fathoms water. Vessels within these voes are at all times perfectly safe, and may anchor wherever they please, being completely land-locked. It should here be observed, that no vessel ought to attempt beating out of the East Sound with a swell from the S.W., for such will inevitably prove hazardous, on account of the narrowness of the channel, and the height of the surrounding land, which frequently produces sudden and baffling squalls. There is no room to tack in the passage, and no ground to hold your anchor, should the vessel miss stays.

ST. MAGNUS BAY.—This comprehends that large space between Sands Ness and Esha Ness. Off the former lies Papa Stour, a large rocky island, steep-to in every part. Several small voes, of 7 and 8 feet water, are on the eastern side of the island; and one called Hamna Voe, on its southern part; there is an anchorage within the latter, in 8 feet water. Between Papa Stour and the main is a passage into St. Magnus Bay, but not to be attempted without a pilot. On the S.W. side of Papa Stour is a natural cave, with three entrances, through which the tide ebbs and flows; this cave has several apartments, and is wide enough to admit a large boat, with plenty of room for the oars. In the centre it becomes wider, and is ornamented with a handsome arch; beyond which, you will be enlightened from an aperture at the top. On the north side of the bay is a curious islet, called Dureholm, preforated by a vast arch, 70 feet high. Here boats frequently arrive to fish, having light from an opening at the top.

Vessels in stormy weather, when making for St. Magnus Bay, should be careful to avoid the Ve Skerries; and, if embayed with westerly winds, and unable to regain the sea, it will be prudent to run into Swarbuck's Min; but if the wind should be to the southward of west, a vessel, in attempting to weather Muckle Roe, may fail in this object, and become so deeply embayed, as to run on shore on Eglisha, the Long

Head, or Isleburg Ness. In this case, it will be better to make for Hillswick, or Hamer's Voe, as more to leeward, and where the entrance is not difficult. If once you get to leeward of the Long Head, it will be too late, with such a sea as the westerly swell sets in during a gale of wind, to attempt Hillswick, and equally impossible to weather Muckle Rooe. The passage between Muckle Rooe Island and Vementry, leads to several voes or inlets, where there is anchorage and shelter from all winds, in from 8 to 20 fathoms water. Some vessels sail through Rooe Sound, which is to the northward of Muckle Rooe Island. A *round rock*, above water, lies midway at its entrance, having a channel on either side of it. This passage is now too shallow, and will scarcely afford sufficient water for large boats. In Housa Voe, Papa Stour, ships of moderate burden may find occasional anchorage, or wait for the tide to the southward.

There is good riding in Oni Frith, the entrance being between Vementry Island and Neing Head; but care must be taken to give a berth to the latter, for *several rocks*, under water, lie off the point. When you have passed these rocks, you will have from 24 to 9 fathoms water, shoaling as you advance; the anchorage is good, and well sheltered.

About a mile to the southward of Esha Ness, the N.W. point of Magnus Bay, is the *Ossa*, or *Esha Ness Skerry*, a *large remarkable rock*, serving, like a beacon, to point out this part of the coast.

GREAT FISHING BANK.—An *extensive bank*, abounding with cod, haddock, and other fish, lies to the westward of the Shetland Islands. It is described as lying from 20 to 30 miles west from Foul Island; beginning to the westward of Westra Islands in the Orkneys, and extending, in a north and north-westerly direction, as far as 20 miles to the north-westward of the Shetland Islands; its breadth is supposed to vary from 18 to 20 miles, and its length to be full 120 leagues. Recent information assigns to it a depth of from 40 to 50 fathoms. Abundance of fish are now annually caught on this bank, rendering it an object of great importance, as well as a national advantage. In all probability, this is part of a bank of soundings, upon which the Orkney and Shetland Islands are based; and, when thoroughly explored, will prove highly beneficial to mariners navigating these parts, enabling them to make a certain landfall.

TIDES IN THE ORKNEYS, SHETLANDS, &c.

THE tide flows, on the change and full days of the moon, as follows:—Pentland Skerries, at 8h. 30m.; Duncansby Head, at 9 o'clock; and the east shore of Swona, at 9½ o'clock; on the west shore, at 10 o'clock; at Kirkwall, 10h. 9m.; west shore of South Ronaldsha, at 10 o'clock; Stromness Harbour, Walls, and Westra, at 9 o'clock; Fair Island, at 10h.; Foul Island, at 9½ o'clock; on the east side of Shetlands, at 9½ o'clock; Brassa Sound, at 10 o'clock; in Lerwick Harbour, at 10½ o'clock; on the east side of Stronsa, at 10 o'clock; in Stronsa Frith, at 11 o'clock; on the east sides of Sanda and North Ronaldsha, at 9¼ o'clock; in North Ronaldsha Frith, at 9½ o'clock.

The stream of flood on this, as on other parts of the Orkneys, comes from the N.W., and runs east between Sanda and North Ronaldsha; south along the west side of Sanda, and between the Red Head of Eda and the Calf of Eda, and continues its progress through Stronsa Frith, until it loses itself in the open sea. That part of the flood which sets on North Ronaldsha, divides, opposite to the kirk, about ¼ of a mile from the shore; one branch of it runs northward to the Seal Skerry, and thence eastward to the sea; the other runs close along the south side of North Ronaldsha over the Reef Dike Rocks, and thence to the north-eastward. The stream near the north side of Sanda, runs along Ire and Rive to Tafts Ness, from Tafts Ness to the Start, and from the Start to Tress Ness, beyond which it is scarcely perceptible. On the east side of North Ronaldsha, the stream runs mostly to the northward. Along the east side of Stronsa, the flood runs south-east; along the west side, south; from Rousholm Head

to Lamb Head, the stream, for the first 3 hours of flood, runs N.E., and from that time until it is low water, S.W. When the south-westward stream of flood has got to the south-west part of Rousholm Head, it there meets the stream of flood from Stronsa Frith, and is thence turned S.E. towards Copinsha Island.

The stream in Stronsa Frith runs about 4 miles an hour with spring-tides; and with neap-tides 1 or $1\frac{1}{2}$. On the north and east sides of Stronsa, the stream is scarcely perceptible, except near to Burrow Head and Lamb Head, where it runs almost 3 miles an hour when strongest. On the south side of Stronsa, spring-tides run 2 miles an hour.

In North Ronaldsha Frith, spring-tides run about 3 miles an hour; neap-tides $1\frac{1}{2}$ mile. There is a race off Tafts Ness; and a heavy sea on the ebb at the Masewell Rocks, on which are 5 fathoms. On the south side of Sanda the stream is scarcely perceptible, except from the Start to Tress Ness, where it runs about 3 miles an hour when strongest.

The flood at Fair Isle, as at the Isles of Orkney, sets in from the N.W. It divides near to the shore on the N.W. part of the island; and running along the north and south ends of it, forms a large eddy on the east side. The stream, when strongest, runs about 6 miles an hour; neap-tides do not run more than 2 miles. Ordinary spring-tides rise 4 feet; extraordinary spring-tides rise 6; neap-tides seldom rise more than 2 feet. At Foul Isle, spring-tides rise 6 or 7 feet, neap-tides 4 or 5 feet. On the east side of the Shetland Islands, spring-tides rise 6 or 7 feet, neaps 3 or 4; in Brassa Sound, spring-tides rise 6 feet, neaps only 4; and the stream runs slowly into the harbour of Lerwick.

In the Pentland Frith and Orkney Isles the water flows about 10 feet with an ordinary spring-tide, and about 5 upon a neap; though, sometimes, by the winds blowing hard from the west or S.W., spring-tides will rise 14 feet, and neaps 6 or $6\frac{1}{2}$. N.E., east, and S.E. winds, which cause lower tides, may sometimes occasion the springs not to rise above 6 feet, and the neap-tides 2 feet. The greatest tides are generally on the fourth day after full and change, and the smallest at the same time after quarter-day.

In the Pentland Frith, the tides run with greater rapidity and diversity of motion than, perhaps, in any other part of the British seas. The obstructions which the direct course of the tide meets with, from the islands lying in the Pentland Frith, diverts its direction into eddies, races, counter-tides, and sometimes into whirlpools, amazing and terrifying to such as are inexperienced in tide-ways; but to those acquainted, these irregularities become serviceable; sometimes by keeping off the violence of the stream, and affording stagnant water, in which a vessel may tack, or anchor, till the return of a favourable tide; at other times, by carrying her against the tide, or more to windward, and thereby facilitating the passage to either side of the Frith; which will more plainly appear from the following description:—

The body of the flood in Pentland Frith comes from the N.W., and its motion is perceived sooner near the land, on either side, by 3 hours, than in the middle of the Frith, being gradually propelled from the shores, outward, as the tide makes. About $\frac{1}{4}$ of a mile from the middle of each island, in its way, it divides into two branches, one of which runs towards the north, and the other towards the south end of it; whence, along with the stream that runs directly with the extremity of the island, they proceed eastward, about a mile or more, and there join, enclosing an eddy, within which there is a slow stream westward towards the island. There is one of these eddies on the east side of the Swona, which extends about $1\frac{1}{2}$ mile from it; one on the east side of Stroma, which extends about a mile from that island; and one on the east side of Pentland Skerries, which is not bounded as the other two, but opens wider as it recedes from these islands, until the streams lose themselves in the open sea. These eddies change their direction from the east towards the south, gradually, as the flood makes; so that the stream, which at the beginning of the tide runs from Swona between South Ronaldsha and Pentland Skerries, at the latter end of the flood, turns towards Duncansby Head. The like eddies are formed with ebb-tide, on the west side of these islands, gradually varying their directions from the west towards the north; only the eddy of Pentland Skerries is very small, not extending above $\frac{1}{4}$ of a mile from the Great Skerry; but the others are as large, or larger, with ebb than with flood-tides. There are whirlpools observed near the south end of Swona with flood; and also near the north ends of Swona and Stroma with ebb-tide; but never so large as to be dangerous to shipping.

Westward from the north end of Stroma, there is always a great swelling sea, and often breakers, during ebb, in the calmest weather, especially with spring-tides; these are called the Swelky of Stroma, and ought to be avoided. The Men of Mey is a rough breaking sea, over a rocky reef, which makes westward from the south end of Stroma with flood-tide.

From Duncansby Head, at 2 hours' flood, over towards Stroma, is a very strong tide, called the Bore of Duncansby, which, with an easterly wind and spring-tide, breaks very much. This is occasioned by a ledge of rocks in that direction, about 8 fathoms below the surface. This tide is often dangerous to boats when they cross the Frith, but is not so violent as the preceding. During the late survey, 5 to 8 fathoms were found on this shoal.

The greatest velocity of spring-tides in the Pentland Frith is 9 miles an hour; neap-tides do not run 3.

Orkneys.—From some observations on the tides in Orkney, it appears that the water begins to rise and fall sooner near the shore, or near visible rocks, than at a distance from them. When spring-tide is at its greatest altitude or depression, the water continues in a quiescent state nearly half an hour; neap-tides continue so about $1\frac{1}{2}$ hour. The motion of the water, both in ascent, descent, and progression, is accelerated from the first to the fourth hour, commonly; from the fourth to the last hour of the tide its velocity diminishes. This, however, admits of some variation from the influence of winds.

The greatest spring-tides and least neap-tides are commonly on the fourth day after the syzigies and quadratures; but in this also the winds have a considerable influence; west and south-west winds making the greatest floods and least ebbs. North and N.E. winds, on the contrary, hinder the rise, and promote the falling of the waters in the Orkneys and on the north coast of Scotland. When the flood-tide is raised higher than ordinary by winds, the next following ebb is not so low as it would otherwise have been. When a high flood is raised by the moon only, the succeeding ebb is proportionably low. Ordinary spring-tides rise about 10 feet perpendicularly, ordinary neap-tides 5; extraordinary great spring-tides rise above 14 feet, extraordinary small spring-tides only 7. Extraordinary great neap-tides rise above 6 feet, and extraordinary small neap-tides not above 2. Yet the rise and fall varies so much, that it would require a long course of observation to determine with certainty what is most common in these cases.

When a stream of tide is interrupted by land or rocks, or confined within a narrow channel, or long arm of the sea, growing uniformly narrower, the water will rise higher there than in the neighbouring places, where it is not so obstructed. If the channel or long arm of the sea, has several windings, or reaches as they are called in the Thames, the superior elevation will not be considerable.

The foregoing particulars relate to the Rising *and* Falling *of the* Tides.

REMARKS on the VARIOUS MOTIONS of the STREAM.

TOWARDS the coast of Orkney and Fair Isle, off Shetland, the flood comes from the north-west. A league or two off the coast, the strength of the stream is scarcely perceptible, unless it be confined by land, interrupted by rocks, or runs over shoals a few fathoms below the surface; in which case its motion is always quicker than on an open uniform coast, where it meets with no interruption.

When the tide begins to rise or fall on the shore, the stream near the shore begins to turn and reverse its direction, a few irregularities excepted.

The stream of tide changes its direction sooner near the land than at a distance from it; inasmuch, that in a place 2 or 3 miles from the land, the turning of the stream is 2 hours or more later than on the adjacent shore. At the intermediate distances the stream turns at similar times. Hence one vessel may find a favourable tide near the land, whilst another, at a greater distance, will have the stream against her, and so on. This contrary direction of the stream is perceptible in the narrowest channels.

During the continuance of flood, the stream varies its direction gradually from the east towards the south; and on the contrary, the stream of ebb varies from the west towards the north—that is, if the stream, when it becomes first perceptible, runs east, at the latter end of the tide it will run nearly south, if the proximity of land or shoals does not hinder or divert its course another way. It will be found of advantage, in a rapid tide-way, to attend to this gradual variation of the stream.

The greatest velocity of spring-tides in Orkney, in the channels where it runs quickest, is about 9 miles an hour. The celerity of neap-tide is about $\frac{1}{4}$ of spring-tide. A spring-tide acquires a considerable degree of strength in less than an hour after its quiescent state begins; neap-tides are hardly perceptible 2 hours after still water. The stream is most rapid generally between the third and fourth hours of the tide.

If a sound or strait, between two islands, lies in the direction of the main body of the tide, the velocity of the stream in that strait will be greater (every thing else alike) than in any other adjacent one not lying in the same direction.

In similar straits or channels, lying in the same direction, and supplied from the same part of the ocean, the velocity of the streams will be in proportion to the width of the inlets directly, and the outlets inversely.

If an island lies directly in the tide-way, the stream will divide or split, before it reaches the island, into two branches; one of which will run towards one end or side of the island, and the other towards the farther end of it, and, in passing along, will be reflected a little by the land, so as not to touch it. The stronger the stream is, and the longer that side of the island towards which it runs, so much farther from it will the stream divide; and the quicker the oblique stream runs along the sides or ends of the island, the stronger will be their reflection. Hence, a vessel in a calm, carried along by a rapid tide or current, will be in no danger of touching a single island or visible rock, if the water is deep enough near them.

If a small island lies athwart a rapid tide-way, that part of the stream which runs along one end of it, will join that which runs along the other, at some distance beyond the island, enclosing between them a curved space, within which there is either no perceptible current, or a slow one towards the island, contrary to the other streams. The stagnant space in the middle of a rapid tide is called an eddy. If the island that occasions an eddy is large, or has other islands or rocks near it, so situated as to inflect the streams considerably out of their direct course, they will not then join, as in the former case, but go off in a parabolic form, widening from the island, and their strength gradually diminishing, till they are lost insensibly in the open sea. Examples of both these eddies have been already described.

Some of them are a mile or two in length, and convenient to beat about in, till the tide is spent. In some there is clean ground, where if there is not wind enough, or sufficient room for tacking, a vessel may stop at anchor till the return of a favourable tide. These eddies may not only be of great service to ships or boats, by sheltering them from a strong stream, but also by carrying them against it, and thereby enabling them to cross it with more advantage, according to the different places to which they are bound. The extent and direction of an eddy are always distinguishable by the eye, when the tide is strong; for the opposition of the bounding streams makes the waves there higher and rougher in blowing weather, or with spring-tides, and of a darker colour in calms with neap-tides, than in other places. The most boisterous parts are near the two extremities of the islands, and a little beyond the vortex, or top of the eddy, where the streams that form it unite.

The collison of these opposite and oblique streams near the island, will excite a circular motion in the water; and, if the celerity of the tide is great, will occasion whirlpools in form of an inverted bell, wide and rounded at the mouth, and narrower towards the bottom. Those, with spring-tide, in Pentland Frith, near the islands Stroma and Swona, may turn any vessel quite round, but are never so large as to endanger her otherwise. There are instances, however, of small boats, which by the inadvertency of the rowers, have dropped into them, and were swallowed up. The cavity is largest when it is first formed, and is carried along with the stream, diminishing gradually in dimensions as it goes; until it quite disappears. Before the extinction of one, two, or sometimes three, more will appear, following each other like so many pits in the sea, moving along with the tide. The suction or spiral motion communicated to the water does not seem to extend far beyond the cavity; for happening in a boat to pass within 20 yards of one of these whirlpools, or wells, as they are called

in Orkney, Mr. Mackenzie was not sensible to any attraction towards it; but, indeed, it was towards the latter end of the tide, when its strength was considerably abated. The diameter of the mouth of the cavity, at that time, he judged to be between 2 and 3 feet. Fishermen affirm, that if they are aware of their approach towards a whirlpool, and have time to throw an oar, or any other bulky body into it, they will get over safe; the reason is, when the continuity of the surface is broken, and the vertiginous motion of the sea interrupted by any body thrown into it, the water must rush suddenly in on all sides and fill up the vacuum. For the same reason, in blowing weather, or when the waves break, though there may be a whirling round, there can be no cavity.

When there is a steep sunken rock near the concourse of such rapid tides, and not very deep below the surface, a most amazing phenomenon will happen; for the stream, being interrupted in its course, and falling suddenly over the rock, is forcibly reflected from the bottom upwards, carrying sand, shells, fishes, or other loose bodies along with it; which, with boats, or whatever else is near, are driven with great violence from the centre of the eruption, all round towards its circumference; then the surface all over continues to swell and bubble for some time, like boiling water, until a regular gyration ensues, and a whirpool begins, which is carried along with the stream, as was said in the preceding paragraph, and lessens by degrees till it is extinguished. Soon after, a new eruption, followed by an ebullition and whirlpool, commences, and then another, until the celerity of the stream abates, or the tide rises or falls too much above or below the rock.

If the tide runs quicker, or more obliquely, by one end of an island than by the other, a languid current will continue running from one of those streams towards the other; that is, the tide along one side of that island will set longer in one direction than in the contrary.

If a strong stream of tide runs across the mouth of a bay that does not reach far into the land, within that bay there will be a slow stream setting contrary to the other. By attending to this, one vessel may keep her course or gain a port, while another is carried away by the tide.

During the last hour or last half-hour of strong spring-tides, the stream in the middle of the channel or sound, and sometimes a mile or two off an open coast, appears rough and breaks, as if running over a shoal, or confined within a very narrow channel; while the sea on each side may be quite smooth. This, strangers have often mistaken for shallow water, and to avoid it, have needlessly gone out of their course, or dropped anchor in an improper place.

There are several tide-ways among the Orkney Islands, where during ebb-tide only, the surges swell to an extraordinary height, and range and break with great violence, even in the calmest weather; inasmuch, that sometimes no open vessel can go over them: but during flood, the water there is as smooth as in any other part. Such places are called, in Orkney, rosts, which the inhabitants are very careful to avoid while ebb-tide continues, but not in the least afraid of them with flood. A rost rages most with a spring-tide and west wind. The most dangerous of these are Dennis Rost, on the north side of North Ronaldsha; Lashy Rost, between the Calf of Eda and Sanda; Rull, near Wart Holm, on the south side of Westra; and Swelky, the west side of Stroma, in the Pentland Frith.

THE COASTS OF FRANCE, FLANDERS, HOLLAND, AND JUTLAND, FROM CALAIS TO THE SCAW.

FROM CALAIS TO THE TEXEL.

Description of the Land, &c.

GENERAL REMARKS.—The appearance of the land from Calais, eastward, is low and flat, skirted all along with small sand-hills, and rising with a gentle and gradual acclivity inland. The churches and large buildings form distinct and conspicuous objects, and may be seen at a considerable distance.

Holland is of a similar description, and somewhat lower, being broken in various parts by the openings of the Rivers Scheldt, Maas, &c. The shores are all the way lined with numerous and extensive *shoals* and *sand-banks*, many of which run parallel to the land, and have various passages between them, which are frequently shifting, and are both intricate and dangerous.

From CAPE GRISNEZ and CALAIS to OSTEND.—Cape Grisnez is of a white cliffy appearance, and has a battery upon it. The coast runs from it towards Blancnez, called also Calais Cliff, nearly E. by N. $\frac{1}{4}$ N., distant 2 leagues. Between Blancnez and Grisnez the land is hilly, though the shore about Wissant (which is midway between) is sandy. A *dry sand*, at low water, extends the whole way along shore from Calais to Cape Grisnez, drying upon an average $\frac{1}{3}$ of a mile from the shore. Upon this sand, to the N.E. and S.W. of Blancnez, are a *few rocks*. The water continues shoal to some distance from the dry sand, and on the parallel of the Bas Escalles, stretches out 2 miles from the coast, turning S.W. to Cape Grisnez, forming the *Ligne Bank*, parts of which, in an E. by N. direction from Cape Grisnez, dry; but to the south of which there is a very shallow channel. The *Rouge Riden* and the *Quenocs* lie to the north and N. by W. from Blancnez, the least water upon each being a fathom; the outer one, the Quenocs, is about $1\frac{1}{4}$ mile from Blancnez. Upon the N.W. part of the Ligne Bank, and called the Barrier, the depth is not more than $4\frac{1}{2}$ feet; and, to the eastward of which, near to the dry sand of the coast, are *some rocks* which dry, called the *Guards*.

Between Blancnez and Cape Grisnez, 16 fathoms is as near as a large vessel ought to stand in shore in thick weather, till you get Cape Grisnez to bear south, when you may haul in for it. Thence to Boulogne, the coast is clear all the way, within $\frac{1}{2}$ a mile from the shore.

A lighthouse is erected upon Cape Grisnez, from which a bright revolving light is shown. It is elevated 46 feet from the base, and 194 feet above the sea at high water; and may be seen, in clear weather, 8 leagues distant.

This light will be distinguished from that of Calais, by the difference of their respective intervals, that of Calais being 4 minutes; the flash is preceded and followed by short eclipses, and that of Grisnez only 30 seconds; but a faint light will be visible in both lights within the distance of 4 leagues.

CALAIS ROAD lies considerably to the N.W. of the harbour, and is sheltered by a *sand bank*, of $3\frac{1}{2}$ fathoms, which begins at $2\frac{4}{5}$ miles N.W. by W. $\frac{1}{2}$ W. of Fort Lapin, and extends E.N.E. $\frac{1}{2}$ E., 3 miles. This is called the Riden of Calais. Ships may anchor near this bank, in from 10 to 13 fathoms. The best marks are, the great steeple on with the westernmost fort, and Blancnez 2 sails' breadth open of Calais land. The ground, composed of gravel, mixed with mud, is excellent for holding. At N.W. by W., 3 miles from the entrance of the harbour, are the westernmost of the *shoals*, called the *Ridens of the Roads*, with $3\frac{1}{2}$ fathoms on them. To pass to the eastward of the Ridens, bring Calais to bear S. by E. There is also a good channel within them, nearly a mile wide, with from 8 to 12 fathoms in it.

SUBMARINE TELEGRAPH.—Ships navigating this part of the coast, when westward of the Ridens, should be very cautious not to anchor near the line of the submarine telegraph, that is, when the two mills near Sandgate ($2\frac{1}{2}$ miles west of Calais) are between the bearings of S. by E. and S.E. by S.

CALAIS lies S.E. $\frac{1}{4}$ S., distant $22\frac{1}{2}$ miles from Dover; S.E. by S., $20\frac{1}{2}$ miles from the South Foreland; and nearly south, 23 miles from the Goodwin light-vessel. The town appears, on approaching it from sea, like an island, with the lighthouse, three steeples, and several windmills on it, one of the steeples being larger than the others.

The most remarkable objects on approaching the harbour in the day-time are, the lighthouse, the steeples of the Church of Notre Dame, the Telegraph, and the Town Hall. Besides the new revolving light (hereafter described) there is a white fixed tide-light, shown on Fort Rouge, to the westward of the entrance of the harbour, elevated 33 feet above the level of the sea, and

may be seen, in clear weather, 10 miles. This light is shown during the time there is a depth of 10 feet on the bar, or 8 feet at the entrance between the jetties. In the day-time a flag is hoisted during the same period of tide. In foggy weather a bell is tolled, when these objects cannot be seen from the offing. The western jetty-head of Calais harbour has been recently extended 296 yards, and a permanent red light is now exhibited thereon, and visible 2 miles distant. This light is continued all night, but is not exhibited during stormy weather, access to the jetty being impracticable.

On the eastern pier-head is a white light, kept only for the private use of H.M. steam-packets. The new revolving light, kept between the pier-head lights, leads into the harbour.

CALAIS NEW LIGHT.—The old revolving light at Calais is discontinued, and instead of it, a light, varied every 4 minutes, by a *flash*, and preceded and followed by short eclipses. The lighthouse stands on one of the angles of the fortifications of the town, about 437 yards distant from the old one. The light is 167 feet above the ground, and 190 feet above the level of the sea, at high-water, and seen, in clear weather, 20 miles. The eclipses will not be total within the distance of 12 miles from the light.

NOTE.—In order to prevent any mistakes arising from the number of lights on this part of the coast, the following are the characters of the different lights in the vicinity of Calais:—Ostende, a fixed light; Dunkirk, revolving every minute; Gravelines, a fixed light; Calais new light, varied by a flash every 4 minutes, as before-mentioned; Cape Grisnez, revolving every $\frac{1}{2}$ minute.

Going into Calais Harbour, which is rather dangerous with northerly winds, keep the mill at the east end of the town on with the jetty-head, and run in close by it, keeping the citadel to the west. Avoid the *reef* that runs from the western jetty. The tides run strongly here. The water at the jetty-head rises about 21 feet, and within the entrance from 15 to 18 feet, according to the winds: at neaps, about 8 feet. High water, full and change, at 11h. 30m. A.M.

It may be observed, generally, that the run from Dover to Calais will always be found shorter than from Calais to Dover, because the tide is always more favourable.

GRAVELINES.—The entrance to Gravelines is 10 miles E. $\frac{3}{4}$ S. from Calais. The church has a tall spiral steeple. This town, which is about a mile from the coast, when viewed at a distance from the sea, appears like an island; the land on each side being low, and full of hummocks. As Gravelines harbour falls dry at low water, it cannot be entered but when the tide is high. There are two beacons, which being brought on with each other, will lead you between the jetties. The marks for anchoring off Gravelines, to the westward of the banks, in the place called the Pit, are, Gravelines steeple south, and Calais cliff W. $\frac{1}{2}$ S., in from 9 to 11 fathoms at low water, on coarse gravel.

Gravelines lighthouse, from which a fixed light is exhibited, stands in latitude 51° 0′ 18″ north, and longitude 2° 6′ 48″ east of Greenwich, to the eastward of the pier-heads at the entrance to the harbour. The building is 83 feet high; and the light, being 95 feet above the level of the sea, will be visible from a ship's deck, at the distance of 5 leagues. There are also two tide-lights.

DUNKIRK lies E. $\frac{3}{4}$ S., about 10 miles from Gravelines; and E. by S., 20 miles from Calais. It may readily be known by its square steeple, which is the highest of the kind on this part of the coast, and may be seen, in clear weather, 5 or 6 leagues off. The Stadt-house is a large square building, with a small spire, and stands near the church, being visible about 4 leagues off.

Between Calais and Dunkirk there is some high land in the country, called Mount Cassel. In clear weather, this land may be seen from the sea at a great distance, serving to distinguish this part of the coast. About the vicinity of Dunkirk, are several fortresses; and behind, inland, are the town and steeples of Bergues.

Dunkirk is a place of very considerable commerce. The approach is by a canal, $1\frac{1}{2}$ mile in length, the port and basin being in the interior of the town. The roadstead is at the outer extremity of the canal, and formed by a sand-bank, running parallel to the shore. The light-house stands in latitude 51° 3′ north, and longitude 2° 22′ east of Greenwich, on the head of the pier, between the harbour and Fort Risban; and 1,531 yards, in a N.W. direction from l'Heuguenar tower. To a vessel distant 4 or 5 leagues, the light will appear to revolve, being eclipsed every minute; but within that distance a faint steady light will always be visible between the periods of the strong glare. The building is 180 feet high; and the light, being 194 feet above the level of the sea, will be visible from a ship's deck at the distance of 8 leagues. The harbour, or tide-light, stands upon the western jetty-head, and is 23 feet above the level of high water mark, being visible 6 miles. On the Tour de Heuguenar is a fixed light, elevated 85 feet above the water, and visible 15 miles. This light is specially intended for the channel, between the Tour de Heuguenar and the entrance of the jetties, and shows its brightest light in that direction. The entrance to the harbour, which is dry at low water, is between the jetties, which have beacons on their extremities: the course in being about S. by E. $\frac{1}{2}$ E. High water, full and change, at 11h. 55m.; spring-tides rise 18 feet.

From Dunkirk the land extends E. $\frac{1}{4}$ N. towards Nieuport, the intermediate land being all low, with hillocks of sand fronting the sea. About 11 miles from Dunkirk, is a *long white*

sand-hill, called *Broers Duyn;* which is somewhat more elevated than the adjacent sand-hills. Furnes, with its two spires of different heights, also stands back, and furnishes a good object to know this part of the coast by. The Broers Duyn has a barren appearance, differing from all the other hills, which are verdant; and it lies north, distant 2½ miles from Furnes. Inland are canals, which communicate from Calais to Gravelines, Dunkirk, Furnes, Nieuport, Ostende, &c.

NIEUPORT is 15 miles from Dunkirk, 25 from Gravelines, and 35 from Calais. It is at present only fit for small vessels which are able to lie dry on a hard sand. The channel in is about 1¾ mile long, lying in a S.S.E. direction, very narrow, unsheltered on its western side, and not safe with strong winds. Nieuport has several steeples and mills, which appear from a distance like a fleet of ships; but there is one square church steeple, with a turret, which is very conspicuous, and larger than the rest. There is also a beacon and castle, and a small lighthouse, by which it will readily be distinguished. A tide-light is shown from half-flood to half-ebb, when small vessels may pass over the bar, visible 6 miles. High water, full and change, at 12h. Spring-tides rise 15 feet.

NOTICE.—A black buoy, marked with white letters "PO," has been lately placed in 16 feet at low water, on the west end of the Stroms Bank, off Nieuport, with the following bearings:—Furnes tower S.S.W. ½ W.; Nieuport tower S. by E.; Middlekercke steeple S.E. by E. ¾ E.; and Ostende light E. ¾ S.

From Nieuport the shore continues to run E. by N., having near it the church of Lombarzede, with a high flat steeple; Westende, nearly a mile farther, has a spire-steeple; Middlekercke, 4 miles distant from Nieuport, and 5 from Ostende, with a high spire-steeple; Raversyde, 1¼ mile from Middlekercke, with a square flat steeple; and Mariekercke, 2¼ miles beyond Raversyde, with a small spire-steeple. About 3½ miles from Raversyde, is Ostende.

OSTENDE bears from Nieuport E. by N., distant 9 miles; from Dunkirk E. ½ N., 24 miles; and from Calais, east, 44 miles. Ostende appears, when at a distance, like an island. It has a church, with a large spire-steeple, a town-house, with a square tower on it, a high lighthouse, and three windmills; two of the mills may be seen very plainly, one at each end of the town; but the third seems to stand in the middle of the town, and, therefore, cannot be so easily discerned. Ostende lighthouse is situated at the N.E. corner of the town, showing a fixed light 87 feet above high water, all night, visible 12 miles; and the two tide lights indicating 14 feet on the bar, are fixed, one 50 fathoms inside of the end of the eastern pier, visible 7 miles; and the other on the Downs on the east side of the town, visible 6 miles. A bell is rung in foggy weather, during tide time.

ADDITIONAL HARBOUR LIGHTS AT OSTENDE.—The following new lights were first shown on the 21st January, 1849. Seamen will therefore observe:—

1st.—That the green light on the west pier, is intended merely to indicate the position of the pier-head, visible 7 miles.

2nd.—That the entrance of the harbour must not be attempted unless the red light of the eastern pier is also shown, visible 5 miles.

3rd.—That when both these lights are shown, they signify that the depth of water between the pier-heads is more than 8¼ and less than 14½ feet.

4th.—That as soon as there are 14½ feet water between the pier-heads, the red light will be extinguished, and the two usual tide-lights shown, one of which stands on the end of the sea-wall, and the other on the sand-hill near to Fort Imperial.

5th.—That these lights will, in their turn, be extinguished when the tide has fallen again to 14½ feet water, at which time the red light of the eastern pier will be re-lighted, and kept burning till the water falls to 8¼ feet, when it also will be extinguished.

THE FLEMISH BANKS.

The western parts of these banks are generally known by the title of the Dunkirk Banks. They are named as follow:—The Sandetie Bank, the Outer Ruytingen, the Inner Ruytingen, the Bergues, the Dyck, the Inner Ratel, the Outer Ratel, the Breedt Bank, the Smal Bank, and that long narrow sand which bounds the Road of Dunkirk to the northward, and is divided into the Snouw, the Brack Bank, the Hils Bank, and the Traepegeer.

THE SANDETIE BANK.—This is the outermost of the shoals, and is about 11 miles in length, and a mile in breadth in the broadest part. It runs in an E. by N. and W. by S. direction, having from 5 to 9 fathoms upon it; except a *patch* towards its western end, with only 3 and 3½ fathoms upon it at low water, spring-tides. This shoal is a mile in length, and ½ a mile in breadth, and must be carefully avoided, as it would be dangerous to approach it in a large ship, for the lead will not give you sufficient warning when either to the northward or southward of this shoal, as you will have 19 fathoms water within ¼ of a mile of its southern

edge, and from 13 to 15 fathoms at the same distance from its northern edge. Close to its eastern and western sides, you will have 6 fathoms on the bank. The centre of this shoal lies with the following bearings, viz.:—Calais S.S.W. $\frac{1}{2}$ W., distant 15 miles; South Foreland lighthouse W. by N., distant $19\frac{1}{2}$ miles; and North Foreland lighthouse N.W. by N., $19\frac{1}{2}$ miles. From this spot the North and South Foreland, and also the Calais lights, can be plainly seen.

At $2\frac{1}{2}$ miles E. $\frac{1}{2}$ N. of the latter shoal is a *patch*, with 5 fathoms on it, about a mile in length, and $\frac{1}{4}$ of a mile in breadth. Eastward of this you will have from 6 to 9 fathoms on the bank. Between the Sandetie and Outer Ruytingen, you will have from 22 to 14 fathoms, the deepest water being along the southern edge of the Sandetie; and it shoals gradually to the southward as you approach the Outer Ruytingen. The channel between these banks is 5 miles wide, with coarse sand, shells, and stones. In approaching the Sandetie Bank from the westward, you will have 20 or 22 fathoms water; but to the westward of the Outer Ruytingen, you will not have more than 12 or 15 fathoms.

The OUTER RUYTINGEN is the second bank you will meet with as you come from the northward, extending from the meridian of Calais, in an E. $\frac{3}{4}$ N. direction, 16 miles, and about a mile in width at its broadest part. On the north side of it you will have from 5 to 9 fathoms nearly the whole length of the bank. On its south side, which is steep-to, a *ridge of knolls*, with only 2 and 3 fathoms upon them, extend nearly the whole length, and are *very dangerous* to approach, even with small vessels, at low water. The most *dangerous shoal* on this bank lies near its west end, and has only 6 feet water on its shoalest part. From this spot Calais steeples bear S.W. $\frac{1}{2}$ S., distant 9 miles; and Gravelines S.S.E. $\frac{1}{2}$ E., $10\frac{1}{2}$ miles. The 3-fathoms shoal on the Sandetie bears N. by E., distant $5\frac{1}{2}$ miles from the centre of this shoal; between which is a good clear channel, with from 14 to 22 fathoms in it, the deepest water being near the Sandetie. This shoal runs E. $\frac{1}{2}$ N. and W. $\frac{1}{2}$ S., $2\frac{1}{2}$ miles, and is $\frac{1}{2}$ a mile broad. From its west end, in 3 fathoms, Calais steeples will bear S.S.W. $\frac{3}{4}$ W., distant 8 miles; and Cape Blancnez S.W. by W., distant 11 miles. When Gravelines steeples bear S. by E. $\frac{1}{2}$ E., you may cross the bank, in from 5 to 7 fathoms, at low water. This will take you a mile to the eastward of the shoal. From the easternmost of the shoals, in $2\frac{1}{2}$ fathoms, on the east end of the Outer Ruytingen, Dunkirk bears S. by E. $\frac{1}{2}$ E., distant 12 miles; and Gravelines S.S.W. $\frac{3}{4}$ W., distant $12\frac{1}{2}$ miles.

The INNER RUYTINGEN is an *irregular bank* of uneven soundings, over which the sea is always very rough; and, therefore, should be avoided. Its western end, in 3 fathoms, lies about N. by W. from Dunkirk steeple: and its eastern part, in $2\frac{1}{4}$ fathoms, lies with Dunkirk steeple S. by W., distant 12 miles. Its direction is E.N.E. and W.S.W., being about 6 miles long. Its shoalest part, over which are only 9 feet, bears from Dunkirk nearly north, distant about $10\frac{1}{2}$ miles; and from Gravelines N.E., 13 miles. This is near the centre of the bank, where it is $2\frac{1}{2}$ miles in width, having not more than 3 fathoms on it.

Between the Outer and Inner Ruytingen, the depth of water is from 9 to 17 fathoms, the bottom being of sand, shells, and coarse gravel.

THE BERGUES.—A mile N.N.E. from the east end of the Inner Ruytingen, lies the southern edge of the Bergues, between which is a channel, of 10 to 13 fathoms. This bank runs nearly east and west, $4\frac{1}{4}$ miles, and is a mile in breadth, with 6, 7, and 8 fathoms upon it generally, with 16 and 17 fathoms close to the northward of it. There are *two shoal patches* on this bank, with only 3 and $3\frac{1}{2}$ fathoms upon them. They lie east and west of each other, distant 2 miles, with 7 and 8 fathoms between them. The western shoal lies from Dunkirk steeple N. by E., and the eastern one, which is the largest, lies from the same steeple N.N.E., distant 15 miles. These *patches* are the *more dangerous*, being at so great a distance from land.

The DYCK is a *long narrow bank*, formed in three divisions—the Western Dyck, the Middle Dyck, and the Eastern Dyck, or Clif Bank.

The western end of the West Dyck lies N.E. from Calais, distant 6 miles; thence it extends east, nearly 9 miles, with from $2\frac{1}{2}$ to 7 fathoms on it, the deepest water being on its west end. This bank is narrow, being not more than $\frac{1}{3}$ a mile wide in its broadest part; but the shoalest part, the west end of which lies N. by W. $\frac{1}{2}$ W. from Gravelines, distant 7 miles, and runs from thence eastward, 5 miles, is only a *narrow ridge*, about 2 cables' length in width. The shoalest part, with $2\frac{1}{2}$ fathoms on it, bears from Gravelines N. $\frac{1}{4}$ E., distant $6\frac{1}{3}$ miles. The western end of this bank may be crossed, in not less than $4\frac{1}{2}$ fathoms at low water, taking care not to bring Gravelines to the southward of S.S.E.

Between the Outer Ruytingen and the West Dyck are 14, 15, 16, and 17 fathoms water, the bottom being sand, small shells, and gravel.

The Middle Dyck, properly called the Dyck, is separated from the West Dyck by a narrow channel, of 4 and 5 fathoms. The western end of the Middle Dyck lies N.W. $\frac{1}{4}$ N. from Dunkirk, distant $9\frac{1}{2}$ miles; and N.N.E. $\frac{3}{4}$ E. from Gravelines, distant $6\frac{1}{2}$ miles. It thence extends about E. by N., 6 miles; its eastern extremity lying from Dunkirk nearly N. $\frac{1}{2}$ W., distant $7\frac{1}{2}$ miles; and from Gravelines N.E. $\frac{1}{2}$ E., $11\frac{1}{2}$ miles. The depths over the Dyck vary from 4 feet to 4 fathoms. Its shoalest part begins about a mile from its eastern end, and continues about $2\frac{3}{4}$ miles to the westward; the west end of the shoal part bears from Dunkirk N.W. by N., distant $7\frac{1}{2}$ miles; and from Gravelines N.E. $\frac{1}{4}$ N., distant 3 miles. The greatest breadth of the

Dyck is nearly a mile. It lies $2\frac{1}{2}$ miles within the Outer Ruytingen, and the depth between varies from 11 to 17 fathoms.

The EASTERN DYCK, or CLIF BANK, is separated from the Middle Dyck by a channel, a mile broad, with a depth of not less than $4\frac{1}{2}$ fathoms. The mark for this channel is, the church at Dunkirk, exactly midway between Bergues and Cassel, bearing about S. $\frac{1}{4}$ W.; but the mariner must be very careful of running on in this direction, since the same mark will lead directly upon the shoal part of the Inner Ruytingen. The S.W. end of the Eastern Dyck bears N. $\frac{1}{2}$ E. from Dunkirk, distant 8 miles; and N.E. by E. from Gravelines, distant 12 miles, Cassel appearing 1° open to the westward of Dunkirk. The general direction of the bank is N.E. by E., 13 or 14 miles. It continues *exceedingly dangerous* full 12 miles from its south-western part, or until you have brought Nieuport steeple to bear S. by E. Its shallowest part is near the S.W. extremity, where there are only from 5 to 9 feet water; and this extends until you bring Dunkirk to bear S.S.W. The breadth of the Eastern Dyck is about $\frac{3}{4}$ of a mile; and over it, to the northward of the shoal part above mentioned, are from 2 to 4 fathoms, until you have passed the marks already given; to the northward of which it suddenly deepens from 10 to 17 fathoms. Vessels in approaching this bank, should carefully keep the lead constantly going. The channel between the N.E. end of the Clif Bank and the S.W. end of the West Hinder, is $3\frac{1}{2}$ miles wide, from a depth of 5 fathoms on each, with from 15 to 18 fathoms in it.

The INNER RATEL lies to the southward of the Middle Dyck, its northern part being only separated by a narrow channel, but with 12 fathoms between them. Its western end is distant about $\frac{1}{4}$ of a mile from the Dyck, having from 4 to 5 fathoms on it, and lying from Dunkirk N.W. by N., distant $7\frac{1}{4}$ miles; and from Gravelines nearly N.E. $\frac{1}{2}$ E., distant 8 miles, extending thence E. $\frac{1}{2}$ N., about 7 miles. Its eastern end bears from Dunkirk N.N.E., a little easterly, distant $7\frac{1}{4}$ miles, and from Furnes N.W. $\frac{1}{2}$ N., $11\frac{1}{2}$ miles. The shoalest part of this bank is about the middle, extending more than 2 miles in the direction of the bank, and being almost a mile broad. The western extremity bears from Dunkirk steeple N. by W. $\frac{1}{2}$ W., and the eastern part N. $\frac{1}{2}$ E., or with Dunkirk just open to the westward of Cassel. There are generally from 15 to 3 feet water over this bank; but only 1 foot in one part, which lies with Bergues and Dunkirk steeples in one.

The OUTER RATEL lies to the south-eastward of the Eastern Dyck, or Clif Bank, from which it is separated about $2\frac{3}{4}$ miles. Between them are from 7 to 12 fathoms. Its S.W. end lies to the northward of the N.E. end of the Breedt Bank, the channel between being about a mile broad, with 6 to 9 fathoms in it. At this end of the Outer Ratel, is a *dangerous knoll*, $1\frac{1}{2}$ mile in length, with only 8 feet water over it. This bears from Dunkirk N.E. $\frac{1}{2}$ N., distant 10 miles, and N.N.W. from Furnes, distant $10\frac{1}{2}$ miles. From hence the Outer Ratel extends 8 miles, in the direction of N.E. by E. $\frac{3}{4}$ E., and is about a mile broad, with *many dangerous shallows* upon it, and should, therefore, always be approached with the greatest care and attention to the lead. The eastern end of the Outer Ratel bears from Furnes N. by E. $\frac{1}{4}$ E., distant 13 miles, and from Nieuport N. $\frac{3}{4}$ W., distant 11 miles. Near the N.E. end of the Outer Ratel are some *small knolls*, of 3 and 4 fathoms water, with 5, 6, and 7 fathoms round them. The farthermost of these has 4 fathoms, and is full a mile off. There is also a *narrow shoal*, of 4 fathoms, to the northward of the N.E. end of the Ratel, distant 2 miles, the middle of which lies from Nieuport N. by W., distant 13 miles, and from Furnes N. by E., 15 miles. This shoal lies midway between the Outer Ratel and Eastern Dyck.

The BREEDT, or BROAD BANK, is the largest of the Dunkirk Banks; and, although divided into the West and East Breedt, it cannot be considered otherwise than one bank, having only 3 fathoms across it between the shoals. This part lies 5 miles N.N.E. from Dunkirk. The West Breedt extends E. $\frac{1}{2}$ S. and W. $\frac{1}{2}$ N., and is from 1 to 2 miles in width. The shoal part of this bank extends from the meridian of Dunkirk W. $\frac{1}{2}$ N., 8 miles, with 2 and $2\frac{1}{2}$ fathoms upon it; except two shoals, which nearly dry at low water. The west end of the shoal water lies from Dunkirk N.W. $\frac{1}{2}$ W., $8\frac{1}{2}$ miles, and from Gravelines N.E. by N., $5\frac{1}{4}$ miles. To the westward of this you will have 5, 6, and 7 fathoms on the bank, except a *small knoll*, of $3\frac{1}{2}$ fathoms, which lies from Gravelines N. by E., 5 miles. The western *shoal* on the Breedt Bank is a mile in length, and has only 2 and 3 feet water on it in some places. The centre of it lies from Dunkirk N.W. $\frac{1}{2}$ N., and from Gravelines N.E. $\frac{1}{2}$ E., 7 miles. At 2 miles eastward of this is the western edge of the *middle shoal*. This is an oval-shaped shoal, 2 miles in length, and $1\frac{1}{2}$ mile in breadth. The middle part of it nearly dries at low water. The west side of the shoal bears from Dunkirk N.N.W., and its east side N. $\frac{1}{2}$ E., distant 4 miles. The Breedt Bank is separated from the Inner Ratel by a narrow channel, with from 5 to 12 fathoms in it.

East Breedt may be said to commence in the meridian of Dunkirk. From thence it extends E.N.E., 5 miles. Its eastern end, in $3\frac{1}{2}$ fathoms, bears from Dunkirk N.E. $\frac{1}{2}$ E., nearly 10 miles. This bank has from 3 to 4 fathoms upon it, except a *narrow ridge*, which commences at its west end, and runs along the south side of the bank for 3 miles. This ridge has only from 2 to 6 feet water on it, and is about 2 cables' length in width. Its west end lies N.N.E. from Dunkirk, $4\frac{1}{2}$ miles, and its east end N.E., $7\frac{1}{4}$ miles.

The SMAL BANK lies within the Breedt Banks, its western end bearing from Dunkirk N. $\frac{1}{4}$ W., distant $3\frac{1}{2}$ miles, and from Zuydcoote N.W. $\frac{3}{4}$ W., nearly 7 miles. At this part are nearly 3 fathoms, the mark being Dunkirk in one with Cassel, bearing S. $\frac{1}{2}$ W., distant $3\frac{1}{2}$

miles; but as this is not a mile from a dangerous and shoal part of the Smal Bank, Dunkirk should never be brought to the westward of Cassel. From its western point, the *bank* stretches about 6 miles east, then E.N.E., $8\frac{1}{4}$ miles.

The shoal part of this bank is of great length, its western extreme commencing $3\frac{1}{2}$ miles N. by E. from Dunkirk, and continuing until its eastern end bears from Dunkirk N.E. by E. $\frac{1}{2}$ E., distant $10\frac{3}{4}$ miles, and from Furnes N. by W., $7\frac{1}{2}$ miles. Part of this dries at low water, to about the extent of $1\frac{1}{2}$ mile; the west and east ends bearing from Dunkirk from N.E. to N.E. by E., distant $4\frac{1}{2}$ miles. The other part of this shoal has from 1 to 10 feet over it, and is in general dangerous. The N.E. end of the Smal Bank bears from Furnes N. by E. $\frac{1}{2}$ E., distant 9 miles, and from Nieuport N. by W. $\frac{1}{4}$ W. Between the eastern end of the shoal and the N.E. end of the bank are some *narrow patches*, of from 10 to 14 feet water, which will be noticed hereafter.

At about the distance of $6\frac{1}{2}$ miles north from Furnes, the Smal Bank unites with the Banks of Nieuport, by means of a *narrow shoal*, of from $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms water, and thus forms the northern boundary of Nieuport Road.

The INNER BANK, which stretches along the coast from Point Gravelines to Nieuport, and forms the northern boundary of Dunkirk Road, is divided into four parts, and distinguished by the names of the Snouw, Braek Bank, Hils Bank, and Traepegeer.

The SNOUW is the westernmost of these. Its western end bears from Gravelines N.E., $4\frac{3}{4}$ miles; from Dunkirk N.W. by W., $7\frac{3}{4}$ miles; and from Gravelines Point N. $\frac{1}{2}$ E., 2 miles. On it is placed a red buoy, in 4 fathoms water, intended to point out the western entrance to Dunkirk Roads. From this buoy the Snouw runs E.S.E., about $1\frac{1}{2}$ mile; then E. $\frac{1}{2}$ S., 3 miles. There are 4 and 3 fathoms over the west end of the Snouw, for the length of $1\frac{1}{4}$ mile eastward of the buoy, so that vessels may cross it in fine weather, with Mardick Church bearing S. by E. $\frac{1}{4}$ E.; but farther east than that it is only passable for boats, its shoal part commencing N. by W. from Mardick, and N.E. $\frac{3}{4}$ E. from Gravelines. A small part of the Snouw dries at low water to the extent of $\frac{1}{4}$ of a mile. This part bears N.W. $\frac{1}{4}$ W. from Dunkirk, and N.N.E. $\frac{1}{4}$ E. from Mardick spire, distant from it $3\frac{1}{4}$ miles. The east end of the bank lies with Little Synthe and Cassel in one.

Besides the red buoy at the west end of the Snouw, there are, along the south edge of this bank, three black buoys, numbered 1, 2, and 3, which, with two white buoys on the northern edge of the *flat* that extends from the shore, called the *Polder*, point out the western channel into Dunkirk Road. The black buoy, No. 1, is nearly a mile E.S.E. from the red one, and lies in 5 fathoms water, with Mardick steeple bearing S. by E. $\frac{1}{2}$ E. In a direction E.S.E. $\frac{1}{2}$ E., $2\frac{1}{2}$ miles farther, is No. 2, with a beacon at the end of a projecting tongue, in 4 fathoms water, with Mardick S.S.W. $\frac{3}{4}$ W., and Dunkirk steeple S.E.; and E. by S. $\frac{1}{2}$ S., more than a mile from this, No. 3 is placed, in $4\frac{2}{3}$ fathoms, with Mardick bearing S.W. $\frac{1}{2}$ W., and Dunkirk steeple S.E. $\frac{3}{4}$ S. The white buoy, No. 1. lies nearly $\frac{3}{4}$ of a mile S.S.W. $\frac{1}{4}$ W. from No. 2 black beacon-buoy, and E.S.E. $\frac{1}{2}$ S., $3\frac{1}{2}$ miles from the red buoy. No. 2, white, lies rather more than $\frac{1}{2}$ a mile S.S.W. from No. 3, black, and N.E. by E. $\frac{1}{2}$ E. from Mardick spire.

The BRAEK BANK is only divided from the Snouw by a narrow channel, of 9 feet water. This passage bears from Dunkirk N.W. $\frac{3}{4}$ N., distant 4 miles, and from Mardick N.E. $\frac{3}{4}$ N., about the same distance; it thence extends E.S.E. for $2\frac{1}{2}$ miles, and nearly E. by S., $2\frac{1}{2}$ miles, where it joins the Hils Bank. The breadth of the Brack at its western end is not more than a $\frac{1}{4}$ of a mile, which continues until it changes its direction to E. by S., when it suddenly becomes $\frac{3}{4}$ of a mile wide. The greatest depths upon it are only 6 feet water; and there are some places where it becomes dry at low spring-tides. These will be found to bear from Dunkirk from north to N.E. by N. The bank lies a full mile from the low water mark on shore.

HILS BANK, as before observed, is joined to the Brack, and limits the boundary of the eastern part of Dunkirk Road. It is very dangerous, not only on account of its shallowness and extent, but from the great depth of water close to its southern edge. Its general direction is parallel to the shore as far as its S.E. point, where there is a black buoy, in 13 feet water, bearing E.N.E. from Dunkirk steeple, and N. $\frac{1}{2}$ W. from Zuydcoote steeple. A little more than a mile N.E. $\frac{3}{4}$ N. from this buoy is another black buoy on the N.E. point of the bank, in 16 feet water, bearing from Dunkirk steeple N.E. by E. $\frac{1}{2}$ E., and from Zuydcoote steeple N. by E. $\frac{1}{4}$ E. On the N.W. shoulder of the Traepegeer, a white buoy is also placed, $\frac{1}{2}$ a mile from the last-mentioned black buoy, in about 19 feet water. These buoys mark out the Zuydcoote, or eastern channel, in which the least depth is 18 feet; but, from the above white buoy to within $\frac{1}{4}$ of a mile of the S.E. black buoy, a *long spit* runs out, on which there are *three patches*, of only 6 to 9 feet water.

The TRAEPEGEER BANK forms the east side of the Zuydcoote Channel, proceeding from the shore half-way between Dunkirk and Nieuport, and terminating Dunkirk Road. On this bank, near the Zuydcoote Channel, there is a *small knoll*, of 6 feet, bearing from Zuydcoote steeple N.N.E. Southward of this knoll is a narrow channel of 6, 5, and 4 fathoms, running eastward nearly 2 miles; and from thence it irregularly shoals up to the beach. The northern edge of the Traepegeer, which forms the southern boundary of the Nieuport Road, continues along shore at about the distance of 2 miles, and may be safely approached by the lead, until

Furnes steeple comes on with Broers Duyn. To the eastward of this line, the Broers Bank rises suddenly to 9 feet from the N.E. prong of the Traepegeer, and should not be approached nearer than 5 fathoms at low water; though, between it and the shore, there is deeper water. After passing to the eastward of this shoal, which bears from Furnes N. by E., and when Furnes bears S.S.W., the main shore may be safely borrowed upon by the lead.

NIEUPORT AND OSTENDE BANKS.

THESE shoals or banks consist of the Middlekercke, Nieuport, Ostende, Stroms, and Wenduin Banks.

The MIDDLEKERCKE BANK is situated about 2 miles to the eastward of a bank which runs nearly parallel with it, and was formerly named the East Breedt. Between these banks is the North Channel, with from 5 to 12 fathoms in it. Middlekercke Bank lies nearly N.E. and S.W., extending 6 miles, and is composed of several patches of sand, on the shallowest of which are never less than $2\frac{1}{2}$ fathoms. Its southern part lies north, a little easterly, from Nieuport steeple, distant 7 miles. Its northern extremity bears from Nieuport N.N.E. $\frac{1}{4}$ E., distant 12 miles; and from Ostende steeple N. by W. $\frac{3}{4}$ W., 8 miles; but its shoalest part, of $2\frac{1}{2}$ fathoms, bears from Nieuport N. by E., distant 8 miles; and from Ostende N.W. $\frac{1}{2}$ W., distant 8 miles. North-eastward of this you will have from 3 to $4\frac{1}{2}$ fathoms on the bank. The irregularity of soundings always occasions a heavy sea upon the Middlekercke Bank.

The bank which lies to the westward of the Middlekercke Bank, runs N.E. by E. and S.W. by W., and is 3 miles in length, with from $2\frac{1}{2}$ to 4 fathoms on it; indeed, it may be said to extend farther, for about $\frac{1}{2}$ a mile N.E. by E. from it is a *spot* of 4 fathoms, with from 5 to 6 fathoms between them. There is also a *patch* of $3\frac{1}{2}$ fathoms, lying E.S.E. from the N.E. end of the bank, distant about $\frac{1}{2}$ a mile, with 8 fathoms between them. The mark for the western end of this bank is Furnes steeple S. $\frac{3}{4}$ W., distant $10\frac{1}{2}$ miles. The shoal of 4 fathoms, off its east end, bears from Furnes steeple N.N.E. $\frac{1}{4}$ E., distant 13 miles; and the patch of $3\frac{1}{2}$ fathoms bears from Nieuport N. $\frac{1}{2}$ E., distant 10 miles.

The NIEUPORT BANK is a mile to the southward of the Middlekercke, and may be considered a continuation of the Smal Bank, being connected by a channel of from 3 to 4 fathoms water. It also connects itself with the Stroms Bank, when bearing from Ostende W.N.W. $\frac{3}{4}$ W. by a depth of from 3 to $2\frac{1}{2}$ fathoms. The western part of the Nieuport Bank bears N.W. from Nieuport; and north, 6 miles from Furnes. Between this point and the Smal Bank is a *bar*, in length a mile, and from 1 to 3 cables' length in breadth, which joins the Nieuport to the Smal, by a depth of from $2\frac{1}{2}$ to 3 fathoms. Vessels must cross this bar, to enter or quit Nieuport Road, by the northern channel, the mark for crossing it being Furnes steeples open to the westward of Broers Duyn, bearing south.

Nieuport Bank extends from the western end E.N.E. $\frac{1}{2}$ E., $9\frac{1}{4}$ miles; its eastern end bearing from Ostende N.W. $\frac{1}{2}$ W., distant 5 miles; and from Nieuport N.E. by N., distant $7\frac{1}{2}$ miles. The broadest part of Nieuport Bank may be $\frac{3}{4}$ of a mile; and the shoal part of the bank, which is 3 miles long, lies between N.N.E. and N.N.W. from Nieuport, the least soundings on it being 6 feet.

OSTENDE BANK is situated about $1\frac{1}{2}$ mile to the eastward of Middlekercke Bank. Its S.W. end bears from Ostende N.W. $\frac{1}{4}$ W., distant 6 miles; and from Nieuport N.N.E. $\frac{1}{4}$ E., $8\frac{1}{2}$ miles; thence extending E.N.E., 6 miles. Its N.E. end bears from Ostende N. $\frac{1}{4}$ E., distant 7 miles; and from Nieuport N.E. $\frac{1}{2}$ N., distant 13 miles. The northern end of this bank is very narrow, with 3 and 4 fathoms over it; but between its S.W. end and that part bearing between N.N.W. $\frac{1}{2}$ W. and N.W. $\frac{1}{2}$ N. from Ostende, it becomes broad; and there are *several patches*, with only 13, 14, and 15 feet water. To the south-westward it approaches within $\frac{3}{4}$ of a mile of the Nieuport Bank, having 4 fathoms water over it, and $4\frac{3}{4}$ fathoms between them. It then stretches to the eastward, and joins the Wenduin Bank by a swashway, of from $3\frac{3}{4}$ to 4 fathoms, N.N.W., $4\frac{1}{2}$ miles from Ostende. The soundings being so irregular on this bank, causes (as on the Middlekercke) a great sea; and although not less than $2\frac{1}{2}$ fathoms has yet been discovered upon it, yet, very probably, there may be other patches of less water; and the heavy sea which, when the wind is from the northward, rolls over these banks with such violence, may cause them to shift their position, increasing and decreasing their depths alternately.

The STROMS is a *dangerous bank*, stretching along the shore from Nieuport to Ostende, and separates the Little from the Great Road of Ostende, joining the bank on the shore to the eastward of Ostende. The western part of this bank has 4 fathoms water, and bears from Nieuport N. by W., distant $2\frac{1}{4}$ miles from the beacon; the mark for this end being Nieuport beacon and spire in one. It is $\frac{1}{2}$ a mile distant from Nieuport Bank, and separated by a depth of 5 and 6

fathoms, and $\frac{3}{4}$ of a mile from the bank of 3 and $3\frac{1}{2}$ fathoms, which lines the shore. Between these are 5 fathoms; on the edge of the bank 4; decreasing towards Nieuport to 3, 2, and 1 fathom. The general direction of the Stroms Bank is E. $\frac{1}{2}$ N., its southern edge approaching within $\frac{3}{4}$ of a mile of the jetty at Ostende. The *dangerous part* of the Stroms Bank begins N. by E. $\frac{3}{4}$ E. from Nieuport, and continues to shoal as it advances to the eastward. In some places there are uncertain swashes, while in others there are not more than 3 feet water. The southern edge is very steep and consequently dangerous; but the soundings from thence towards the coast are regular, and will guide any vessel working into the little road of Ostende. A black buoy is now placed on the western end of the Stroms Bank; it lies with Furnes steeples S.S.W. $\frac{3}{4}$ W., and Nieuport S. by E. $\frac{3}{4}$ E.

Little Ostende Road lies to the southward of the Stroms Bank; Great Ostende Road is between the Stroms and Ostende Banks.

The WENDUIN BANK is situated between Ostende and Wenduin. Its western end bears N. by W., $3\frac{1}{2}$ miles from Ostende, and has 3 fathoms water over it. Thence it extends east, a little northerly, about 7 miles, and terminates $2\frac{1}{2}$ miles from Blankenburg, which place then bears S.S.E. $\frac{1}{2}$ E. The shoal part of the Wenduin Bank is very narrow, and runs parallel to the coast, extending 2 miles, and having $1\frac{1}{2}$ fathom water over it. Its western end bears from Ostende N.E. $\frac{1}{2}$ N., distant 5 miles; and from Blankenburg W.N.W., distant $6\frac{1}{2}$ miles, Its eastern end bears from Ostende N.E. $\frac{3}{4}$ E., 7 miles; and from Blankenburg N.W. by W. $\frac{1}{2}$ W., $4\frac{3}{4}$ miles.

DIRECTIONS FOR SAILING BETWEEN CALAIS AND OSTENDE.

VESSELS coming from the westward should endeavour to make the land a little to the westward of Calais, somewhere about Cape Grisnez or Cape Blancnez, that part being elevated, and more readily to be distinguished; and when proceeding towards Dunkirk, may run along shore, from Cape Grisnez so far as Oye, in from 18 to 14 fathoms water, at the distance of 4 miles from the land; by which they will avoid the Ligne, Quenocs, and Riden Banks; and leave, on the port side, the shoal of 6 feet on the west end of the Outer Ruytingen, and also the western part of the West Dyck. When in the meridian of Calais, you may haul more in shore. Should you be bound to Calais, as soon as it bears S. by E., you may steer for it, as you will then be eastward of the Ridens. In working between the above shoal and the shore, care must be taken to avoid it; and when Oye bears S.S.E. you may stand in nearer to the land, until you are within 2 miles of the shore. Run along at that distance, steering E. by S., until you reach the red buoy on the western end of the Snouw; then an E. by S. $\frac{1}{2}$ S. course will take you through Dunkirk Roads. Your soundings will show your approach to the coast between Oye and Gravelines.

Vessels coming in from the northward should not bring Calais steeple to the westward of S. by W. $\frac{3}{4}$ W., in order to avoid the shallow part of the Sandetie, on which are only 3 fathoms at low water. This bearing will only take you $1\frac{1}{2}$ mile to the westward of the shoal; passing which, you should keep Calais on the above bearing, and not go to the eastward of the meridian of Calais, until you are as far to the southward as the West Dyck, in order to avoid the 6-feet shoal on the Outer Ruytingen; and when within 5 or 6 miles of Calais, you may steer for Gravelines, and thence to Dunkirk Road.

If, with a ship of great draught of water you are obliged to work into the road between Oye and Gravelines, be careful to avoid the *Western Dyck*, over which are only 3 fathoms water. It lies $4\frac{1}{2}$ miles from the coast, and is steep-to, having close to its edge from 13 to 15 fathoms, and between it and the shore from 9 to 15 fathoms; the ground rocky, with shells. Midway of this space, when sailing to the eastward, you will find a depth of $6\frac{1}{2}$ fathoms, this being a continuation of the Breedt Bank. As you approach the entrance to the road, your soundings will change to sand and oaze.

A frigate coming from the northward, may safely cross the Outer Ruytingen and West Dyck, if she keep Calais bearing S.W. $\frac{1}{4}$ W. This bearing will keep you to the eastward of the shoal on the Outer Ruytingen, in not less than 6 fathoms water,

nor less than $4\frac{1}{2}$ or 5 fathoms on crossing the West Dyck. Although in the above course there would be sufficient water for a large ship, it is strongly recommended for all vessels of a heavy draught of water, to pass to the westward of all the shoals, by keeping Calais S. by W. $\frac{1}{4}$ W. Ships bound for the North Sea, should not bring Calais to the westward of the above bearing, until the South Foreland bears W. $\frac{1}{2}$ N. They may then shape a course to the north-eastward.

The port of Gravelines is only capable of accommodating very small vessels; and the channel to Mardick is stopped up.

DUNKIRK ROAD is bounded by the Snouw, Braek, Hils, and Traepegeer Banks, and the bank which lines the shore, its length being about 12 miles. From the red buoy at the western end of the Snouw, to Dunkirk, the distance is $7\frac{1}{2}$ miles, the road running E. by S. $\frac{1}{2}$ S. and W. by N. $\frac{1}{2}$ N. It thence continues nearly east and west, $4\frac{1}{2}$ miles farther, or so far as Zuydcoote Channel. Its breadth, from northward to southward, is not more than $\frac{1}{2}$ a mile—in some places not so broad; that is, with a depth of 4 fathoms. The soundings are from 7 to $8\frac{1}{2}$ fathoms, with a bottom of mud and sand, which holds well. This road, however, is only sheltered by the surrounding banks, which are always under water, and is, as has been shown, very narrow; therefore fit only for vessels bound to that port; but as it is the nearest shelter for vessels coming from the British Channel in cases of necessity to resort to, we shall describe the route which may be taken in going there. The banks to the northward are steep throughout; and so is the in-shore one, from Gravelines to Dunkirk. To the eastward the soundings will indicate your approach towards the in-shore one.

The WESTERN PASSAGE is pointed out by six buoys, which have been described in page 89. The first, or western one (red), lies at the western end of the Snouw; three black ones, marked 1, 2, and 3, lie on the southern edge of the same sand; and on the opposite side are two white ones, placed on the northern edge of the in-shore sand, which here takes the name of the *Polder*.

A vessel should first make for the red buoy, as already directed, which lies in 5 fathoms water, $4\frac{3}{4}$ miles N.E. from Gravelines spire; and N. $\frac{1}{2}$ E., 2 miles from the Downs at Gravelines Point. You are to leave this buoy to the port. Being about $2\frac{1}{2}$ cables' length to the southward of this red buoy, and in from 8 to 9 fathoms water, Gravelines bearing S.W. $\frac{1}{4}$ W., and Dunkirk S.E. by E. $\frac{1}{4}$ E., steer E. by S. $\frac{1}{2}$ S., passing to the southward of the black buoy No. 1, from thence between the black buoy, No. 2, of the Snouw and the white buoy, No. 1, of the Polder. This white buoy is so placed to show the boundary of the channel to the southward, and the old entrance to Mardick. When you have advanced so far as to bring Gravelines Point to bear S.S.W., take great care to avoid going to the southward of the two white buoys, for, by so doing, you may run upon the west end of the Polder, which has over it from 9 to 6 feet; this end bears from Mardick N. by W. $\frac{1}{2}$ W., and from Gravelines spire N.E. by E. $\frac{1}{2}$ E., being $\frac{1}{2}$ a mile to the eastward of the white buoy, No. 1. When in mid-channel between these two buoys, if with a large ship, the course should be E. by S. $\frac{1}{2}$ S., 1 or $1\frac{1}{2}$ mile, or until you come equi-distant between these and the next two buoys; you will then perceive the black buoy, No. 3, and the white buoy, No. 2, and can steer directly between them.

A small vessel having arrived between the white and black buoys, Nos. 1, can proceed eastward without danger. But a ship of great draught of water must wait until half-flood.

Having advanced to between the black buoy, No. 3, and white buoy, No. 2, you will have passed a *sandy bar*, over which are from 5 to $5\frac{1}{4}$ fathoms, between the eastern part of the Snouw and Polder; you will then be in the road, and may anchor. In coming from the westward, the red and three black buoys must be left to your port hand, and the two white buoys to your starboard. Between the red buoy and the bank which joins the shore, are from 7 to 9 fathoms water. From thence, easterly, the depth increases to 10 fathoms, and decreases again till you have passed the bar of 6 fathoms, which begins westward of the black buoy, No. 3, and joins the Polder. About 2 cables' length to the westward of the black buoy, No. 2, is a *small patch*, with only 3 fathoms over it. To the northward of this it is dangerous to pass, although there is a depth of 7 fathoms. Having crossed the bar, you will find your soundings increase.

The customary anchorage is between the beacons of Dunkirk and the black buoy, No. 3, fine sand and oaze, holding well. Here you can take the advantage of the

flood to enter the port, and the communication with the shore is easy. To the eastward of the jetties there is more mud, but vessels seldom anchor there, although the shelter from the north and N.W. winds is greater, and the ground must hold well but it is advisable for ships, in strong northerly gales, when unable to get into the port, to anchor between Dunkirk and Zuydcoote, because, in case of emergency, it will be less dangerous to run on shore there than to the westward. Vessels drawing 13, 14, or 15 feet, may run into the port at high water, the entrance drying at low water spring-tides; but those of greater draught must discharge their cargoes in the road. The jetties run out N. by W. $\frac{3}{4}$ W. To the eastward of the jetty, the bank, which joins the shore, rises gradually, so that the soundings will sufficiently point out your approach toward it. When the wind blows from the northward or westward, it generally occasions a heavy sea in Dunkirk Roads.

The EASTERN, or ZUYDCOOTE CHANNEL, lies in a N.E. $\frac{1}{2}$ E. and S.W. $\frac{1}{2}$ W. direction, between the Hils and Tracpegeer Banks, and is distinguished by two black buoys and one white; a black buoy has been placed at the N.E. end, and another on the S.E. edge of the Hils Bank: the white buoy lies on the N.W. end of the Tracpegeer. These have been described in page 89. In sailing from Dunkirk Road to Nieuport, Ostende, or Flushing, you will proceed through the Zuydcoote Channel, leaving these two black buoys on your port side, and taking care to have the white buoy to the starboard: here your depth will be from 3 to 4 fathoms; but you should endeavour to pass nearer the black buoys, on account of the *small knoll*, of 6 feet, which has already been noticed. Being nearly midway between the two black buoys, you will clear this shoal; and steering towards the white buoy, will pass to the northward, at the distance of 2 or 3 cables' length.

Large vessels should not attempt going through the Zuydcoote Channel without a fair wind, and at high water. Small ships drawing less than 13 feet, may run through with safety, even should the buoys be removed, by bringing Leffrinckoucke steeple as much open to the eastward of the great steeple of Bergues, as that steeple will be to the eastward of the little steeple; or if the weather should be hazy, and these steeples cannot be seen, then the steeple of Zuydcoote, bearing S.S.W., a little southerly, will carry you through. At high water, a small vessel may pass with the above marks, only taking care not to bring Leffrinckoucke steeple to the westward of the little steeple of Bergues, as by so doing, there would be danger of being set on the *knoll*, of 6 feet, which bears N.N.E., distant $2\frac{1}{2}$ miles from Zuydcoote. Thus, having passed safely through the Zuydcoote Channel, you will reach the western end of Nieuport Roads, and have from 5 to 8 fathoms water. But as the Smal Bank in that part is steep-to and dangerous, and not above $\frac{1}{2}$ a mile distant from the black buoy, when you have passsd the white buoy, your course through Nieuport Road is E. $\frac{1}{4}$ N.

Vessels drawing less than 11 feet water, when entering the Zuydcoote Channel, if unable to distinguish the colour of the first buoy they meet with, should endeavour to pass close to the eastward of it; for if it should be the white buoy, there will be sufficient water over them $\frac{1}{2}$ a mile to the eastward of it: but if the black buoy, it will then direct them to the middle of the channel. Strangers may always obtain a pilot, who will conduct them to the anchorage.

NIEUPORT ROAD is bounded to the northward by the eastern part of the Smal Bank and western end of the Nieuport Bank, to the eastward by the Stroms and to the southward by the Tracpegeer. It is 8 miles long, running E. $\frac{1}{4}$ N.; and its breadth at the eastern part, and from thence to within 2 miles of Zuydcoote Channel, is about $1\frac{1}{4}$ mile. In it is a depth of from 6 to 8 fathoms, the ground being sand and mud, and holding well. To the northward of Zuydcoote Channel the breadth of the road is not more than $\frac{1}{2}$ a mile; and, as before observed, you must be cautious how you approach the Smal Bank, close to the edge of which are 8 fathoms water. The mark for the eastern part of the road, is Nieuport Steeple in a line with the beacon at the entrance of the port. Here also the Stroms Bank begins—in short, Nieuport Road is completely enclosed by the banks; and there is no good passage into it for large vessels at low water. The best way to approach it is by Dunkirk Road, for the following reasons:—

The Northern Channel or passage out to seaward, is between the Smal and Nieuport Banks, the Middlekercke Bank, and a bank lying 2 miles to the westward of it, and lies in the direction of N.E. $\frac{1}{2}$ E. and S.W. $\frac{1}{2}$ W., being 10 miles long and 1 broad. This channel extends out too far from the shore for any object on land to be visible; and would be very difficult to enter Nieuport Road by, without either leading-mark

or buoys; it is, therefore, very little frequented, unless in leaving the port; and then you must have fair weather and a spring-tide. In adopting this passage, bring Furnes on with the west side of Broers Duyn, bearing about south, and keep it so until you have crossed the *bar* which joins Nieuport and the Smal Banks together. This bar you will find $1\frac{1}{4}$ mile long, and 3 cables' length broad, with a depth of 3 to 4 fathoms. Immediately when you deepen your water to 4 or $4\frac{1}{2}$ fathoms, make good a N.E. $\frac{1}{2}$ E. course, and run on for 12 or 13 miles, which will carry you clear to the northward of all the banks.

The first part of the channel between the N.E. part of the Smal Bank and the S.W. part of the Nieuport Bank, is narrow, with from 5 to 6 fathoms, but may be borrowed upon by the lead. Between Middlekercke Banks and the bank lying to the westward of it, the channel becomes wider, with from 6 to 10 fathoms.

Vessels drawing only 12 feet water, may go over the western part of the Nieuport Bank at a quarter flood, with Nieuport steeple bearing S.S.E., but not more southerly, as that bank shoals suddenly. They may then stand out to the N.E., without regarding Middlekercke Banks, if the water be smooth.

The north-east passage lies between the Nieuport and the Stroms Banks. This channel is 5 miles long, lies in an E. by N. direction, is about $\frac{1}{2}$ a mile broad, and the only communication between Nieuport and Ostende Great Road. Vessels drawing 12 or 13 feet may work through, only avoiding the shoal part of the Nieuport Bank; but larger ships must not attempt it until the sea is elevated some feet, and they obtain a leading wind. To sail through, bring the spire and beacon of Nieuport in one, and sail on thus, until Middlekercke comes S.E. by E. $\frac{3}{4}$ E., and Furnes S.S.W. $\frac{1}{4}$ W.; you will then be in from 5 to 6 or 7 fathoms water, and at the entrance of the channel, and close to the northward of the black buoy, which is now the best mark for this entrance, the bottom being sand and mud; whence steer E. by N., about 6 miles, and you will be in Ostende Great Road. In sailing thus you will have from 5 to 6 fathoms for the distance of 4 miles, and then from $2\frac{1}{2}$ to 4 fathoms at low water; this latter depth will be when you are crossing that part which unites the Stroms and Nieuport Banks, Ostende then bearing E.S.E. $\frac{1}{2}$ E.; beyond which the depth increases to 5 and 6 fathoms.

To sail from Ostende Great Road to Nieuport Road, by the N.E. passage, bring Ostende to bear S.E. by E. $\frac{3}{4}$ E., Nieuport S.W. by S., and Middlekercke south, a little easterly; then steer W. by S., until you bring Nieuport spire and beacon in one, which is near the black buoy on the west end of the Stroms Bank.

Eastern Channel.—To sail out of Nieuport Road, by the Eastern Channel, you must pass between the Stroms Bank and the shore, through Little Ostende Road. Be careful to avoid the shoal part of the Stroms Bank, which is steep-to; and working along, your soundings will point out your too near approach to the coast. When you have got the beacon and steeple of Nieuport in one, Furnes bearing S.W. $\frac{3}{4}$ S., and Middlekercke E.S.E. $\frac{1}{2}$ E., you will have 5 fathoms water, and be at the entrance of the Eastern Channel, near to the black buoy, then steer E. $\frac{1}{4}$ S., 4 miles, till Middlekercke bears S. by E.; then an E. $\frac{3}{4}$ N. course 5 miles, will bring you near the jetties of Ostende.

NIEUPORT we have already mentioned, is fit only for very small vessels; and the mariner unacquainted with the channel, should not attempt an entrance without a pilot. The jetty may be approached to $\frac{1}{4}$ of a mile distance, where there are from 3 to $3\frac{1}{2}$ fathoms water; but on approaching the bar, this depth rapidly decreases. Vessels compelled to run in, should pass close to the westward of the jetty, following the direction of the channel, where, if no pilot is to be obtained, they may take the sands on the western side. It is high water, on full and change days, at 12h. Spring-tides rise from 15 to 18 feet; neaps from 14 to 15 feet.

ROADS of OSTENDE.—There is a great and a little road. The former is situated between the Nieuport, Ostende, Wenduin, and Stroms Banks; and lies E. by N. and W. by S., being 7 miles long and a mile broad, with a depth of from $4\frac{1}{2}$ to 6 fathoms, on sand and oazy ground. It is here, about $2\frac{1}{2}$ miles off shore, that large ships, bound to Ostend, generally anchor, and wait a wind or tide to enter the port.

In coming from the northward for the GREAT ROAD of OSTENDE, you must, with a large vessel, cross the Ostende Banks. But at night it is advisable, when they have made the light, either to stand off and on till day, or to anchor in 7 or 8 fathoms, to the north-eastward of the lighthouse. The soundings will then sufficiently apprise them of their too near approach to the Wenduin Bank. The light can be seen full

4 leagues off—a distance sufficient for them to guard against the banks, as well as to those who, bound to Ostende, are desirous of anchoring in the Great Road; but small vessels, drawing less than 13 feet, may safely run into the Great Road, by keeping between N. by W. and N.N.W. ½ W. from the lighthouse. In no part of their progress will they have much less than 3 fathoms, unless the Ostende Bank should shift its present position,—a circumstance by no means unlikely.

If, in the Great Road, you are caught in a gale of wind from the south-westward, you should immediately regain the offing; if from between north and west, then run for the Scheldt. Should a large vessel, in the middle of the Great Road, be obliged to run for the Scheldt, she should steer E. ½ N., in order to pass to the southward of the Wenduin Bank; and when N. by E. from Wenduin Church, may edge over into the Weilinge Channel. It is highly prudent to guard against westerly winds; but those from the eastward are seldom dangerous. A pilot is commonly taken here, or at Blankenberg, for the port of Ostende. Vessels bound to the Great Ostende Road, may enter between the Middlekercke and Ostende Banks, having the steeples of Furnes and Oost Dunkirk in a line, bearing S.W. ½ S., until Ostende lighthouse comes S.E. The last mark leads into the road, where you may anchor, with the great steeple of Ostende bearing S.E., and Nieuport steeple just within a large sand-hill, nearly S.W., in 5½ or 6 fathoms, about 2½ miles from the shore. There is also good riding more to the eastward, within Ostende Bank, on clayey ground, in 6 fathoms, with the body of the town of Ostende S. by E.; Middlekercke S.W.; and Blankenberg E. by S.

To sail from the Outer to the Inner Road, small vessels commonly cross the Stroms Bank, with Ostende Town Hall bearing S.E.; but to do so, they should take half-flood, as on this part of the Stroms you will only have from 3 to 6 feet at low water, spring-tides.

LITTLE OSTENDE ROAD, as before described, lies to the southward of the Stroms Bank, and between that and the bank which lines the shore. Its ground is not good, particularly near the harbour, and, therefore, vessels should not run for it in foul weather, except when driven by necessity; but, in fair weather, when coming from the northward, or from the Great Road, you must enter it from the westward, in order to take advantage of the flood in entering the harbour. To do this, a small vessel may cross the western end of the Stroms, in not less than 12 feet, by keeping Westende steeple S. by W., but not farther westward. Vessels drawing more than 14 feet, must beware of the *flat*, of 14, 15, and 16 feet, which extends N.N.E. ¾ E. from Westende steeple, full a mile out. This flat continues stretching along towards the shore, narrowing its limits until it reaches Ostende Jetty. Between Westende and Ravershyde are from 15 to 22 feet water near its edge; but these depths continue no farther than Mariekercke. Opposite Ostende are not more than 20 feet water, and still less to the eastward, where the Stroms Banks nearly unite with the shore, about 1½ mile to the eastward of the jetty, there being only 15 or 16 feet; but beyond this, to the eastward, you find 15 to 18 feet a mile off the shore. Merchant-vessels, drawing 12 or 13 feet water, may come as near as 6 miles from the shore, anywhere between Nieuport and Blankenburg, without danger, for the banks of Ostende and Middlekercke have sufficient water for them to pass safely over, except at very low spring-tides, where 2 or 3 *small spots*, of 15 feet, have been found, and the Nieuport and Wenduin Banks will be to the southward of them.

The HARBOUR of OSTENDE.—Vessels intending to enter the harbour of Ostende, should keep to the westward, until there is sufficient water on the bar for their purpose, because, after full sea in this port, the flood runs a long time to the eastward.* There is generally a pilot-vessel lying at sea, with a blue flag hoisted; and, at proper periods of the tide, flags are hoisted near the lighthouse, which have the following significations:—A small blue flag shows when there is a depth of 14 feet over the bar; a large blue flag when there are 17 feet; and a red flag when there are 24 feet. Should the weather prevent a pilot coming on board, and the wind blows hard from the northward, so as to compel you to run for the harbour, then keep the church well open to the westward of the lighthouse on the western side of the harbour; and, on approaching the bar, bring the two flagstaffs and the eastern jetty in a line, and they will lead you over the bar, in the deepest water. On entering the harbour, pass close to the eastern jetty, and take care the stream does not drive you to the eastward of it; run on so far as the inner end of the jetty, and warp to a convenient berth, By night

* For description of the lights at Ostende, see page 86.

bring the two tide-lights in one, and they will carry you over the bar; and it may be observed, that the Stroms Bank can always be crossed when you can go over the bar. A bell is placed near the tide-light, upon the battery of the east pier-head, and will signalize, in foggy weather, the approach to the entrance of this port, as follows:—As soon as there are 4 metres 40 centimetres (16 feet of Ostende) water on the bar at the entrance of the harbour, the bell will be rung every $\frac{1}{4}$ of an hour during 5 minutes, until the water is fallen to 4 metres 40 centimetres (16 feet of Ostende). It is high water on full and change days, at 0h. 20m. P.M. Spring-tides rise from 15 to 17 feet, neaps from 13 to 15 feet.

NOTE.—Every commander going into the harbour of Ostende, is required to take a pilot, or pay for one.

Ships coming from the westward, and bound to Ostende or the Scheldt, who may be desirous of passing on the outside of the banks, should, when Cape Grisnez bears S.E., distant 5 miles, steer N.E. by E., 33 miles, allowing for the set of the tides, by which they will pass 3 miles to the north-westward of the Sandetie Shoal, of 3 fathoms, and get into the latitude of 51° 22′, which is to the northward of all the banks already described; keep in this latitude, with the lead constantly going, and at the distance of 16 or 17 miles, they will find 17 fathoms, about mid-channel, between the N.E. end of the Clif Bank and the S.W. end of the Hinder Bank. As this channel is not more than 4 miles wide from the depth of 4 fathoms on each side, it is advisable to pass through it by day-light, as the shoal water generally shows itself.

In clear weather, and under favourable circumstances, when a good departure can be taken, you may safely pass to the southward of the Sandetie, by which the distance will be shortened. When Cape Blancnez bears S.S.W., distant 10 miles, and the South Foreland N.W. by W., you will have 22 fathoms water; from thence, an E. $\frac{1}{2}$ N. course for 31 miles, will bring you to the before-mentioned situation, between the West Hinder and Clif Bank, in 17 fathoms. In steering the before-mentioned course, you will pass nearly 3 miles to the northward of the Outer Ruytingen and Bergues Banks.

By continuing to run eastward, in the same parallel, about 16 or 17 miles, they will, after passing over some irregular soundings, of 14 to 9 and 12 fathoms, get into the meridian of Ostende, and at about 7 miles from the land, with Ostende bearing about S.S.W., and Blankenberg S.E. $\frac{1}{2}$ E.; but, as they may not be certain of their latitude within 2 or 3 miles, and as such an error might here, with a large ship, prove fatal, it will be more advisable to run into latitude 51° 25′, after passing the Clif Bank, until they get opposite to Ostende, where the banks are less dangerous. When ships from the northward are bound for Ostende or the Scheldt, through West Deep, they should not run to the southward of 51° 22′, until they have seen Ostende, Wenduin, or Blankenberg; nor attempt making the land to the westward of Wenduin.

If, before you reach the latitude of 51° 22′, you should perceive your water shoal, you may probably be getting on the banks at the entrance of the Scheldt; in which case, steer westward, until you obtain sight of Ostende Town or lighthouse, the latter, as before observed, being visible 4 leagues from the land.

The new light at Blankenberg, and the light at Heyst, will be of the greatest service to mariners approaching this part of the coast, as a single bearing of them will at once point out their situation.

FROM OSTENDE TO ROTTERDAM.

Description of the Land, &c.

FROM Ostende to Blankenberg and Sluys, the coast is generally low, with small sand-hils; but about a mile to the eastward of Ostende there are some hummocks, more elevated than the rest, named the Spanish Sand Hills. Another hill always appears conspicuous, about midway between the Spanish Hills and Wenduin. Wenduin Church, with a square steeple, is nearly 7 miles E. $\frac{3}{4}$ N. from Ostende; and 2 miles beyond Wenduin is Blankenberg. From Ostende to Blankenberg, the land runs nearly E. $\frac{3}{4}$ N.; it then turns a little more easterly, for 9 miles, or so far as the entrance to the Swin of Sluys. Blankenberg Church has a steeple, the shape of

which is very common on these coasts, being covered with that kind of peaked roof, known among sailors by the term bluff, to distinguish it as well from the common square steeple as from the spire, and has two mills near it. In approaching this place, you generally perceive a number of boats hauled up on the sandy beach; and the steeples of Bruges appear conspicuously up the country. Between Blankenberg and Sluys, are several bluff-topped churches, and one with a spire-steeple. Sluys may be known by its grove of trees, and two remarkable bluff steeples. The channel leading to Sluys is called the Swin. Sluys is 3 miles up the Swin, and is a fortified place. On the opposite side of the Swin is Cassandria, situated on the western side of the island of Cadsand.

At Blankenberg is a small fixed light, elevated 44 feet, and is shown from sunset to sunrise.

At Heyst, a fixed light, of a natural colour, is now established on the sand-hills, to the northward of the town, in latitude 51° 20′ 22″ north, and longitude 3° 14′ 7″ east of Greenwich. The lighthouse is 25 feet high; but the light is elevated 48 feet above the level of high-water, spring-tides, and will be visible from seaward between the bearings of east, round to W. by S., at the distance of 8 miles.

Weilinge Light-Vessel.—A light-vessel, carrying a *red light*, has been established in the Weilinge Channel, near the bank, called the "*Paarde Markt*," from which the following bearings are given:—Villa d'Ecluse Tower, south; Flushing Tower E. $\frac{3}{4}$ S.; West Kapelle light N.E. $\frac{1}{2}$ E.; Lissewege Tower S.W. by W. The light is visible 8 or 9 miles distant. The vessel is painted *red*, and carries a ball at the mast-head.

CADSAND is a low island, nearly 12 miles long, and about 5 broad, having several churches and mills upon it. The church of Groede is near the middle of the island, with a spire and telegraph on it. Toward the western part of the island is the town of Cadsand. The shores of this island form the southern side of the entrance to the River Scheldt.

PILOTS IN THE SCHELDT.—The Minister of Foreign Affairs gives notice to mariners, that from the 15th of August, 1842, there will be organized, at the mouths of the Scheldt, a Belgian pilot service, for vessels bound to Antwerp or Ghent, *via* the Terneuse Channel.

The distinguishing marks for the Belgian pilots are:—

1. The word "Antwerpen," surmounted by the letter "P," painted in black letters, of the height of 80 centimetres, on both sides of the sail; as also the number of the boat.
2. A red flag hoisted at the mast-head. The number of the boat will be sewed on to this flag, in white figures.
3. The words "Bateau Pilote," and the number of the boat painted on the stern.

The advantages which the vessels bound to Ghent and to Antwerp will derive from shipping a Belgian pilot, are:—

1. For vessels bound to Ghent.

A. To proceed direct from sea to Terneuse, without change of a pilot.

B. To pay at Ghent, after arrival there, the inward sea pilotage.

C. To pay there also, prior to departure, the outward sea pilotage, and pilotage from Terneuse to Flushing.

2. For vessels bound to Antwerp.

A. To pay on arrival at Antwerp the sea pilotage inwards, and the river pilotage from Flushing to Antwerp.

B. To pay at Antwerp, prior to departure, the sea pilotage outwards, as well as that from Antwerp to Flushing.

The Belgian pilots at the mouths of the Scheldt, are all invested with a distinguishing medal, indicating their station, grade, and number.

They will be furnished with instructions for the use of masters of vessels, printed in the English, French, Dutch, Danish, German, Spanish, and Italian languages.

The ISLAND OF WALCHEREN is to the northward of Cadsand, being about 10 miles long, and 8 miles broad. The land on the west part of the island is high in comparison, large sand-hills appearing, when viewed at a distance, in hummocks. That on the north-east side is not so high; but the whole coast is composed of white sand-hills. On the west part of the island stands West Kapelle, with a bluff steeple, and a short projection at its top. The church of West Kapelle forms a conspicuous object, and may be seen on approaching the island, either from the northward or westward. A bright fixed light is exhibited on this church, elevated 146 feet, and visible 15 miles. A little to the westward of this church is a windmill.

FLUSHING lies about 7 miles south-eastward from West Kapelle, and $3\frac{3}{4}$ miles from Middleburg. This is a well-fortified place, and may be known by its lofty spire-steeple and its Stadt-house, a large square building. Here are two excellent harbours, the entrances to which are formed by jetties, both dry at low water; but to the eastern one is annexed a basin, in which ships-of-war are laid up in ordinary. Between the islands of Cadsand and Walcheren, is the entrance to the Hondt, or West Scheldt, the principal branch of which runs up to Antwerp. The breadth of the river, opposite Flushing, is at least $2\frac{1}{2}$ miles wide; but this river is rendered so very intricate by *numerous sand-banks*, that no mariner should attempt its navigation without engaging a pilot.

At Flushing is a fixed light, placed on a wooden eminence, on the west harbour bulwark. It is raised 49 feet above high-water mark, is visible at a distance of 10 miles, and illuminates

the horizon from E.S.E., through south, to N. by W: At Terneuse, on the opposite side of the river, 10 miles from Flushing, a fixed light has been established on the western harbour dyck, and is kept burning the whole night.

About $2\frac{3}{4}$ miles to the E.N.E. $\frac{1}{2}$ E. from West Kepelle, is Domburg, with a high spire-steeple; and to the eastward of Domburg is East Kapelle, with a small spire. The northern shore of Walcheren, from the Sconce Point, at the entrance of the Port of Camp Veer, or Ter Veer, has three signal stations, besides a signal-post at West Kapelle; one at Sconce Point, a second on the Downs, to the north-westward of Fort der Haak, and the third on a remarkable white sand-hill, near Domburg. Every part of the shore has a good beach, but commanded by the sand-hills, with many flake-jetties for the shelter of boats. Middleburg steeple is high, and may generally be seen when coming in from sea, forming a conspicuous sea-mark, although it is situated considerably inland.

The Chamber of Commerce have opened a canal from Middleburg to Camp Veer, which lies on the north-eastern side of the island, through which vessels may now pass with facility. Storehouses have been erected on its banks, fitted for the reception of all kinds of merchandize; and foreigners are allowed to deposit their goods, and export them again, free from all duties. A small lighthouse is erected on the southern side of the entrance of this canal, which serves sufficiently to point out its situation.

NORTH BEVELAND.—To the eastward of Walcheren lies North Beveland, being separated by a passage, called the Veer Gat, which is navigable all the way to Flushing; but it is narrow, and much encumbered by *shoals*. North Beveland is about 8 miles long, and 3 miles broad. Its northern shore forms the southern boundary of the Eastern Scheldt, while that of Schouwen encloses it to the northward. The river between them is full 4 miles broad.

SCHOUWEN lies to the north-eastward of Walcheren. Its northern and western parts have also many sand-hills on them, some of which are long and white, and called the Woolpacks; others appear in hummocks. The lighthouse at Schouwen is erected on the N.W. side of the island, and exhibits a revolving light, elevated 105 feet above high water mark. The light is visible 20 miles, and illuminates the horizon entirely; it appears 25 seconds in every $1\frac{1}{2}$ minute, and its greatest brilliancy lasts 10 seconds, but the eclipses do not appear total within the distance of $4\frac{1}{2}$ leagues. The tower is in latitude 51° 42′ 30″ north, and longitude 3° 41′ 45″ east of Greenwich.

Zierickzee Church, which stands on the southern part of this island, appears somewhat like St. Paul's, in London. There is a fixed light placed on a house, situated on the west pier of Zierickzee Harbour. It is raised 42 feet above high water mark, and visible at the distance of 5 miles, and illuminates the East Scheldt and Zierickzee Roads. Brouwershaven lies on the northern side of the island of Schouwen; and the channel formed between the islands of Schouwen and Goeree, is commonly called Brouwershaven Gat, or Passage. The navigation is very much impeded by *numerous shoals*, and requires a pilot: it leads to Williemstadt, &c.

Renesse Harbour Leading Lights are situated on the north side of Schouwen. These two lighthouses have been constructed, near the village of Renesse, so as to form a leading-mark for ships entering the Brouwershaven Gat; both fixed lights: they bear W.N.W. $\frac{1}{4}$ W. and E.S.E. $\frac{1}{4}$ E. of each other, distant $\frac{1}{4}$ a mile. The easternmost, and highest, is a stone tower, painted black, and carries a light 121 feet above high water mark. It is masked on two sides; and is only visible between N.W. by N. and W. $\frac{1}{4}$ N., to the distance of 16 miles.

The westernmost light is on a scaffold, 91 feet above high water; it is also masked on two sides, so as only to illuminate a small part of the horizon towards the Brouwershaven Gat from N.W. $\frac{1}{2}$ N. to W. $\frac{1}{2}$ N., distant about 12 miles.

N.B.—In order to prevent any one, when in the Brouwershaven Gat, from mistaking the Goeree light for the Renesse lights, when in a line with each other, that of Goeree has been masked on the side of the Gat, so as not to be visible from the outer black buoy to the fourth white buoy.

Verklikker Light is a small fixed light, on the N.W. part of Schouwen, about 3 miles westward of Renesse, and $1\frac{1}{4}$ mile north-eastward of Schouwen coast light. It is shown 55 feet above high water mark, and visible in the Gat of Brouwershaven from N. by W. to W. by S.; its only use is to show the proper anchoring berth in the night.

GOEREE ISLAND lies to the north-eastward of Schouwen, and appears, when viewed at a distance, in white hummocks, those at the west end being the highest. Near the northern shores of this island stands Goedereede, or Goeree Church, with a square steeple, being one of the principal marks for entering the West Gat. It shows a light at night. This light is fixed, and placed 148 feet above high water mark; is visible at the distance of 6 leagues, and illuminates the horizon from W. $\frac{1}{2}$ N., round to the northward, and to S.E. Nearly 2 miles to the westward of the Church, a tall spire of brick, called the Steen Baak, or Stone Beacon, has been constructed for another mark; which also carries a light at night. This light is fixed, 98 feet above high water mark, and visible at the distance of 10 or 12 miles, and illuminates the horizon from E. by S. round by north, to W.S.W. The light on the Stone Beacon, with the coast light of Goeree Church forms the leading-mark for the entrance of the Slyk Gat. To the southward of them is the Church of Ouddorp, with a spire.

VOORN ISLAND lies to the north-eastward of Goeree, and appears fronted with small sand

hills. On the north-western point of the island, $1\frac{3}{4}$ mile north-eastward of the Pest-house, stands the Maas lighthouse on the Downs, exhibiting two separate fixed lights, elevated 46 feet above high water mark. One of them is a white light, and illuminates the Maas Flat, or Bar, in the direction of north to N.N.W. to the distance of about 7 miles; the other light is red, visible 3 miles off, between N.W. and W.N.W.

On the south side of Voorn Island stands the town of Hellevoet Sluys. A fixed light is placed on a tower, built for the purpose, on the west pier of Hellevoet Harbour; it is placed 46 feet above high water mark, and visible 8 miles, from S.E., through south, to N.W. A canal has been constructed through the Island of Voorn to the Maas. This was opened November 8th, 1830, and promises to be of infinite service to Rotterdam, as a vessel can now get to sea from the Maas, by passing through this canal at any time. It is now generally adopted by vessels drawing $16\frac{1}{2}$ feet water, instead of the old, intricate, and circuitous passage. Vessels going from Hellevoet Sluys to the Maas, near Rotterdam, will only take 4 hours. Hellevoet Sluys is a fortified town, with a pier.

The channel between Voorn and Goeree is about 3 miles wide, and encumbered with the *Hinder* and *other sand-banks*, over which there are two navigable channels. That to the southward runs along to the side of the island Goeree, and is called the West Gat; that to the northward is named the North Gat. Both are well buoyed; but this navigation requires the assistance of a pilot.

The northern part of Voorn Island forms the south side of the entrance to the River Maas, leading to Rotterdam, Near the N.E. part of the island is the Brielle Church, remarkable for its large square steeple. On the pier at Brielle there is a light, but it only burns on moonless nights.

At $1\frac{1}{4}$ mile to the northward of the island of Voorn is the Hook of Holland; within which inland is Gravesande. The River Maas contains *many sandy flats*, which must impede its navigation, and render a pilot always necessary.

Remarks on the Buoyage between Walcheren and the Hook of Holland.—All the black buoys in the different channels are to be left on the port hand when going in, and all the white buoys on the starboard. The red buoys may be passed on either side; the upper part only is red, the head and middle white. Wreck-buoys are chequered black-and-white in every part.

In the Goeree, Slyk, and West Gat, and likewise in the Maas and Spleet, all the buoys and beacon-buoys are numbered in large figures. The outermost black or white, and the red, of each channel, are marked No. 1, all of the same colour following; those red are counted with the white.

DESCRIPTION OF THE BANKS AND CHANNELS BETWEEN OSTENDE AND THE HOOK OF HOLLAND.

The WEST HINDER, although not very shoal, is dangerous, from its great distance off the land, and from its being directly in the way of vessels from the westward, bound for the Scheldt. It is a *long narrow bank*, lying in the direction of N.E. $\frac{1}{2}$ E., about 13 miles in length. Its southern end, in 5 fathoms, lies N.W. by N., distant about 4 miles from the N.E. end of the Clif Bank, or Eastern Dyck, being in latitude 51° 23′ north; and its northern end in latitude 51° 34′ north. The depths on the bank are very irregular—from $4\frac{1}{2}$ to 3 fathoms, shoaling from 15 to 9 fathoms very suddenly, the latter depth being close to the edge of the bank.

The south end of this bank bears from the North Foreland lighthouse E.S.E., distant 36 miles; from the Galloper light-vessel S.S.E. $\frac{1}{2}$ S., 29 miles; from Ostende N.W. $\frac{1}{2}$ N., 20 miles; and from West Kapelle W. $\frac{3}{4}$ N., 39 miles. The north end bears from the Galloper light-vessel S.E. $\frac{1}{4}$ S., 26 miles; from Ostende N. by W., 24 miles; and from West Kapelle W.N.W. $\frac{1}{2}$ N., 32 miles.

In the day-time, this bank may be generally discovered by the rippling of the tide over it; but it is advisable to keep the lead going, when approaching this or any other of the banks on the Flemish coast, when in a depth of less than 20 fathoms, for you will find 14 and 12 fathoms close to the bank; and the shoal part, with knolls of 3 fathoms, extends full 10 miles along the centre of the bank, and should at all times be approached with great caution.

FAIRY BANK.—At 3 miles to the westward of the south end of the West Hinder, lies the *Fairy Bank*, extending N.E. $\frac{1}{2}$ E., about 8 miles, and from $\frac{1}{2}$ to $\frac{3}{4}$ of a mile broad, with from 4 to 9 fathoms on it. Its shallow part, with $4\frac{1}{2}$ fathoms on it, is 2 miles in length, and nearly in the centre of the bank, between latitude 53° 23′ and 53° 25′ north, and 32 miles from the North Foreland; in the channel between this bank and the West Hinder, are 14 to 19 fathoms, except near its north end. In mid-channel there is a *narrow shoal*, of 9 fathoms, about 2 miles in length, running parallel with the bank, having 16 to 19 fathoms close to it.

About a mile to the westward of the Fairy Bank is *another bank*, running parallel with it, 4 miles in length, with from $6\frac{1}{2}$ to 9 fathoms on it. There are *some patches* of 9 and 10 fathoms off its S.W. end, and also one of the same depth near its N.E. end; and there are some 10-fathom *knolls*, full 2 miles to the westward of this bank, having from 15 to 20 fathoms close to them. When in the parallel of the North Foreland, these are the first shoals you will meet with after passing the Falls, when bound to the eastward. By sounding on them, you will be warned of your approach to the West Hinder.

NORTH HINDER.—The south part of this bank bears N. by E., distant 2 miles from the north end of the West Hinder, having in the channel between them from 12 to 19 fathoms. It thence extends N.E. by N., 6 miles, to latitude 51° 42′ north, having from $4\frac{1}{2}$ to 5 fathoms on its shoalest part, which runs about 2 miles along the centre of the bank; from this to the extreme of the bank are $6\frac{1}{2}$ to 8 fathoms.

EAST HINDER.—The south end of this bank commences in latitude 51° 30′ north, and lies $1\frac{1}{2}$ mile to the eastward of the north end of the West Hinder, having 12 to 20 fathoms in the channel between them. This bank is about 11 miles in length, and $\frac{3}{4}$ of a mile in breadth, with a *narrow ridge* of 4 fathoms running nearly the whole length of the bank. Its north end lies in latitude 51° 40′ north. Between this bank and the North Hinder are 14 to 21 fathoms; and the channel is 3 miles wide.

BLIGH BANK lies about $2\frac{3}{4}$ miles to the eastward of the East Hinder, and runs in a N.E. direction, 10 miles, and is from $\frac{1}{2}$ to $\frac{3}{4}$ of a mile broad, with from 5 to 9 and 10 fathoms on it. Its north end lies in lat. 51° 42′ north, and lon. 2° 48′ east. The spot with 5 fathoms upon it is only a mile in length, and $\frac{1}{4}$ of a mile in width; the centre of it lies in latitude 51° 35′ north, and on the meridian of Nieuport. There is a *small patch* of $5\frac{1}{2}$ fathoms at each end of this bank. On all other parts of it there is sufficient water for the largest ships. Between the Bligh and the East Hinder are from 18 to 21 fathoms, sand and shells.

Between the Bligh and Thornton's Ridge is a *bank*, about 3 miles in length, running in an east and west direction, with from $8\frac{1}{2}$ to $9\frac{1}{2}$ fathoms on it. Close to this, on the south side, are 18 and 19 fathoms; and along its north side 15 fathoms. About 2 miles E.N.E. of this, is *another narrow bank*, about 3 miles in length, with $8\frac{1}{2}$ to $9\frac{1}{2}$ fathoms on it, and from 15 to 18 close to it.

THORNTON'S RIDGE extends in an E.N.E. $\frac{1}{2}$ E. and W.S.W. $\frac{1}{2}$ W. direction, and is about 10 miles in length, and $1\frac{1}{2}$ mile in breadth in its broadest part. Its N.E. part lies about $2\frac{1}{2}$ miles to the westward of the Rabs, between which are from 9 to 17 fathoms. The shoal part of this bank is narrow, and about 3 miles in length. This part has only from 2 to 5 fathoms upon it, and is dangerous. On all other parts of this bank there are from 6 to 9 fathoms. When on the shoalest part of Thornton's Ridge, Bruges steeples show nearly midway between Blankenberg and Leiswegen, the latter place bearing S. $\frac{1}{4}$ E., and West Kapelle S.E. by E. $\frac{1}{2}$ E., about 17 miles distant. Bruges steeples between Blankenberg and Leiswegen, rather nearer to the latter, bearing S. $\frac{1}{2}$ W., carries you to the eastward of the Ridge. Bruges steeples, open to the westward of Blankenberg, bearing S. $\frac{3}{4}$ E., will take you clear to the westward of it; and Middleburg steeple just open to the southward of West Kapelle, bearing S.E. $\frac{3}{4}$ E., will clear it to the northward; but the land is so low and so distant, that these marks will seldom be available from the deck of a small vessel.

The RABS are some irregular *ridges of rough ground*, lying directly in the way of vessels from sea, bound to the River Scheldt, through the Duerloo Channel. They are about $1\frac{1}{2}$ mile in breadth, and the shallowest part, in latitude 51° 35′ north, has 4 fathoms on it. The outermost, or western part of them, bears from West Kapelle N.W. $\frac{1}{4}$ W., distant 13 miles; and from Thornton's Ridge N.E. by E., distant nearly 3 miles, extending N.E. and S.W. The soundings are uncommonly irregular, suddenly changing from 4 to 8 fathoms, being unlike any other soundings hereabout. West Kapelle steeple on with Middleburg, bearing S.E. $\frac{1}{2}$ E., leads on the middle of the shoal. Bruges steeples will then be just open to the eastward of Leiswegen, bearing S. by W. $\frac{1}{4}$ W.; but this is so long a mark, that it will be seen only in very clear weather. The rippling of the tide and the lead will, however, commonly point them out with sufficient certainty. West Kapelle light S.E. by E., leads between Thornton's Ridge and the Rabs, in 8 to 10 fathoms water.

To clear the Rabs on the north side, bring Middleburg steeple to bear S.E. This bearing will take you across the west end of the Middle and Stone or Steen Banks, in 7 or 8 fathoms. Or West Kapelle light S.E. $\frac{1}{4}$ S., will lead in from sea into the Stone or Steen Diep.

Between the Rabs and the Raen Sand, at the entrance of the River Scheldt, is a large space, called the West Pit, about 6 miles in length. The depths in the pit are from 12 to 16 fathoms, shoaling gradually towards the Raen, but deepening towards Thornton's Ridge, close to which are 17 fathoms, with good holding ground.

The SCHAR lies N.N.E., 2 miles from the north end of the Rabs. This is a *narrow bank*, with from 7 to 9 fathoms on it, extending E.N.E. and W.S.W., about 3 miles; between it and the Rabs are from 18 to 20 fathoms.

The STONE or STEEN BANKS are *two ridges*, divided into the *North* and *South Stone Banks*, lying nearly in the direction of E.N.E. $\frac{1}{2}$ E. and W.S.W. $\frac{1}{2}$ W., to the extent of $8\frac{1}{2}$ miles. This is the extent of the shoal part of the bank; but it continues to run about $1\frac{1}{2}$ mile farther from

each end of these shoals, with from 6 to 8 fathoms on it. The N.E. extremity of the North Stone lies with Middleburg steeple just open to the eastward of East Kapelle, distant from the latter $8\frac{1}{4}$ miles, bearing S. $\frac{1}{2}$ E.; and West Kapelle Church S.S.W., distant nearly 10 miles. At the S.W. end, West Kapelle bears S.E. by S. $\frac{1}{4}$ S., distant 8 miles, and East Kapelle S.E. $\frac{3}{4}$ E., distant $10\frac{1}{2}$ miles. The South Stone Bank is not at any part above $\frac{1}{2}$ a mile wide, its length being about 2 miles, with 3, 4, and 5 fathoms upon it. The northern end of the South Stone Bank is distant nearly 2 miles from the southern end of the North Stone Bank, on which there are only 2 fathoms on its shoalest part. Between them are from $5\frac{1}{2}$ to $7\frac{1}{2}$ fathoms, through which the largest ships may pass, the leading-mark being Middleburg steeple, very little to the southward of Domburg steeple, bearing S.S.E. $\frac{1}{2}$ E.

The South Stone Bank is a *very narrow circular ridge*, 2 miles long. Its northern end lies N. by W. $\frac{1}{4}$ W. from West Kapelle, distant $7\frac{3}{4}$ miles, and its southern end N.N.W. $\frac{1}{2}$ W., distant $8\frac{1}{4}$ miles. Over this bank are 3 and 4 fathoms. The windmill which stands to the westward of West Kapelle, just touching the eastern part of the sand-hill, which forms the west face of the island of Walcheren, then appearing in one, bearing S.S.E. $\frac{3}{4}$ E., will carry you clear to the southward of this shoal, in 7 fathoms water.

Walcheren Road, or Stone Deep, is formed by the Stone Banks to the north-westward, and the Rassen, Kuerens, and Banjaard Banks to the south-eastward. It is about 2 miles in width, and 7 miles in length, in an E.N.E. $\frac{1}{2}$ E. direction, and has from 6 to 13 fathoms water in it, shoaling gradually towards the in-shore bank, the ground being clay, and holding well. The marks for the best anchorage, in about 7 fathoms, are West Kapelle bearing S. by W.; and Middleburg steeple on with the west end of the wood, between Domburg and East Kapelle, bearing about S. by E. $\frac{1}{4}$ E.

The MIDDLE BANK lies $1\frac{1}{2}$ mile northward of the Stone Bank, and runs parallel with it. In the channel are from 11 to 18 fathoms. This bank lies E. by N. $\frac{1}{2}$ N. and W. by S. $\frac{1}{2}$ S., and is nearly 13 miles in length, from 9 fathoms at each end, and about $\frac{3}{4}$ of a mile in breadth; except near its west end, where it is about $1\frac{1}{4}$ mile broad. The shoalest parts of this bank lie near its extremities, and have from $3\frac{3}{4}$ to 5 fathoms on them. Between them the bank may be crossed, in from 6 to 7 fathoms, without danger, a distance of 7 miles. The western shoal is $\frac{3}{4}$ of a mile in length; its centre, in 4 fathoms, bears from West Kapelle N.N.W. $\frac{3}{4}$ W., $10\frac{1}{2}$ miles. The northern end of the shoal water, on the north part of the bank, bears from West Kapelle N.N.E., distant 13 miles; from thence it extends 2 miles W. by S. $\frac{1}{2}$ S., with from $3\frac{3}{4}$ to 5 fathoms on it.

SCHOUWEN BANK is narrow, and lies northward of the east end of the Middle Bank, and runs parallel with it. The channel between them is $1\frac{1}{2}$ mile broad, with from 12 to 19 fathoms in it. This bank extends E. by N. $\frac{1}{2}$ N. and W. by S. $\frac{1}{2}$ S., 12 miles, and is about $\frac{1}{2}$ a mile broad, with from 4 to $8\frac{1}{2}$ fathoms on it. Its N.E. end lies in latitude 51° 50′ north, and longitude 3° 31′ east. The shoalest part of this bank is a *narrow ridge*, near its centre, about $2\frac{1}{2}$ miles in length, with 4 and $4\frac{1}{2}$ fathoms on it. Its eastern end bears from West Kapelle N.N.E., 16 miles; and its western end N. by E., 14 miles. There is also a *small patch*, with $4\frac{1}{2}$ fathoms on it, near the west end of the bank, lying N. $\frac{1}{4}$ W., 13 miles from West Kapelle. On the other parts of the bank are from 6 to $8\frac{1}{2}$ fathoms.

Having described all the outer banks, we shall now proceed to the inner banks, being those at the entrances to the River Scheldt, &c.

The LEISWEGEN, or SCHOONEVELDE BANK, is a part of an *extensive shoal*, commonly known by the name of the *Raan*. It is a mile long, and $\frac{1}{2}$ a mile broad, having 2 fathoms water over it. The western end of this shoal lies N.E. by N. from Blankenberg, distant $7\frac{1}{2}$ miles; and from Ostende N.E. by E. $\frac{1}{2}$ E., distant 15 miles. Its eastern part lies N.E. from Blankenberg, distant 8 miles, where it is divided from the Raan by a *flat*, of 4 and $3\frac{3}{4}$ fathoms water. The direct course through this passage is, with the steeple of Cassandria S.S.E.; but it should never be attempted without a thorough knowledge of your situation, or the assistance of a pilot.

The RAAN is an *extensive* and *dangerous bank*, on which are several patches of very shallow water. Its eastern part forms the western boundary of the Deurloo Channel; its southern part, the northern limit of the Spleet Channel. Its western side is divided from the Schoonevelde Bank by the flat already mentioned; and its northern extremity is pointed out by a red buoy; the length of the Raan, north and south, being about 6 miles. Upon this bank are from 3 fathoms to 5 feet at low water, with regular soundings as you approach it from the northward, gradually shoaling to the edge of the sand; the lead will, therefore, always prove a sure indication of your approximation to it.

The INNER, or RIB BANK, is a *long narrow shoal*, extending from the meridian of Blankenberg in an E. $\frac{3}{4}$ S. direction, to where Groede steeple bears S. by E.; it has *several patches* of 1 to 2 fathoms on it. This bank lies to the southward of the Schoonevelde and Raan, and divides the Wielinge from the Spleet Channel. This latter passage is about $\frac{3}{4}$ of a mile wide, and has from 4 to $5\frac{1}{2}$ fathoms within it. Towards the Elboog it becomes narrower, and somewhat more intricate, shallowing to $2\frac{1}{2}$ fathoms. The mark for sailing through the Spleet Channel is Middleburg steeple on with West Kaapduinen, bearing nearly E. $\frac{1}{4}$ S.

There are seven black buoys lying on the inner edge of the Rib Bank and Hompel; and

one to the westward, called the Fairway Buoy, also black, to direct vessels through the Wielinge Channel.

The Outer, or Fairway buoy, lies in $4\frac{1}{2}$ fathoms water, with Bruges steeples on with a conspicuous sand-hill, about $\frac{1}{2}$ a mile to the eastward of Blankenberg, called Lucifer's Duin, bearing S. $\frac{1}{4}$ E., and 4 miles from the land.

The next buoy, marked No. 4, lies on the west end of the Rib, in $4\frac{3}{4}$ fathoms, $2\frac{1}{2}$ miles E. by S. $\frac{1}{2}$ S. from the outer buoy, with the steeple of Leiswegen between those of Bruges, bearing nearly S. by W., and 3 miles from the beach.

No. 3 buoy lies $1\frac{1}{3}$ mile E.S.E. $\frac{1}{4}$ E. from No. 4, in $4\frac{1}{2}$ fathoms on the south side of the Bol of Heyst, with Bruges steeples over the sandy hill called Slakerduin, bearing S. by W. $\frac{1}{2}$ W., and Ramskapelle on with Heyst Mill S. $\frac{1}{4}$ W., distant 3 miles.

No. 2 buoy lies E. $\frac{1}{3}$ N., $2\frac{1}{3}$ miles from No. 3, in about 4 fathoms, on the east end of the Bol of Knoke, with Bruges steeples a little to the eastward of the Gaanpad, bearing S.S.W. $\frac{1}{2}$ W., nearly on with Ramskapelle. To the S.E. of this buoy are 6 to $6\frac{1}{2}$ fathoms. When this depth decreases to the southward, it is a sure sign that you are approaching the Paarde, on the west side of which the light-vessel is moored; and in the day-time, Blankenberg may be seen to the southward of Lucifer's Duin.

No. 1. buoy lies nearly 4 miles E. by S. $\frac{3}{4}$ S. of No. 2, on the east end of the Rib, in 4 fathoms, with Cassandria steeple bearing S. by W. $\frac{1}{4}$ W., and 2 miles from the land.

On the south edge of the Hompel are three black buoys lying as follow:—

The west buoy lies $1\frac{3}{4}$ mile E.S.E. from the No. 1 buoy, on the edge of the Hompel, in $4\frac{1}{2}$ fathoms, with Cassandria Church bearing S.W. $\frac{1}{4}$ S., and $1\frac{1}{2}$ mile from the land.

The middle buoy lies E.S.E. $\frac{3}{4}$ of a mile from the west buoy, in $4\frac{1}{2}$ fathoms, with the white buoy of the Cadsand S.S.E., distant about $\frac{1}{3}$ of a mile, and Groede steeple S.S.E. $\frac{1}{2}$ E.

The east buoy of the Hompel lies a mile E. by S. of the middle buoy, in $4\frac{1}{2}$ fathoms, with Groede steeple bearing S. $\frac{3}{4}$ E., and the Orange Mill, in Flushing, E. $\frac{1}{4}$ S., distant 4 miles, and in one with the harbour-light.

The *Staart Sand* lies to the N.E. of the east end of the Hompel; near its east end are *several patches*, which dry at low water.

The ELBOOG is a *hard narrow sand*, drying at low water. That part of its southern end which dries, lies W. $\frac{1}{2}$ N. from the pier of Flushing, distant 1 mile. From this flat it extends to the north-westward, rather more than 3 miles. From thence a *bank* of shallow water, passable only by small vessels, connects it to the Raan. The northern side of the Elboog forms the south boundary of the Deurloo Channel. On the east part of the Elboog is a white buoy, with Briskens Church and Mill in one.

The PAARDE is a *narrow shoal*, of from $2\frac{1}{3}$ to $3\frac{1}{2}$ fathoms, lying in the Wielinge Gat. It is $1\frac{1}{2}$ mile in length, with from 5 to 7 fathoms in the channels on each side of it. There is a white buoy near the N.W. end. The buoy lies in $4\frac{1}{2}$ fathoms, about $1\frac{1}{2}$ mile west from the black buoy, No. 4, on the Rib. The marks for the buoy are Leiswegen steeple, a little to the eastward of Heyst Mill, bearing S.W. by W. $\frac{3}{4}$ W. The Wielinge light-vessel is moored on the west side of the Paarde Markt, about $\frac{1}{3}$ of a mile to the south-west of the white buoy of the Paarde, and carries a single *red light*.

WIELINGE.—Between the Paarde and the Inner, or Rib Bank, is an excellent channel, called the French Pass, or Wielinge, leading to the Scheldt. It is, in most parts, $1\frac{1}{3}$ mile wide, and has regular soundings of 4, 5, 6, and 7 fathoms in it. The Paarde gradually shoals as you near it; and on the edge of the Rib Bank, are 5, 4, and $3\frac{1}{2}$ fathoms. Flushing Cathedral bearing E. $\frac{2}{3}$ S., will lead you clear through it from abreast of the Wenduin Bank to the Sluys, passing the black buoys of the Rib on the port, and the white buoy of the Paarde on the starboard hand.

CADSAND BANK lies in the channel, at the entrance to the West Scheldt, with a white buoy upon its northern edge, which lies E. by S. $\frac{1}{2}$ S., nearly $4\frac{1}{2}$ miles from the buoy of the Paarde, in about 4 fathoms. Its marks are the harbour lighthouse, E. $\frac{1}{4}$ N. The Cadsand is a *narrow shoal*, about $1\frac{3}{4}$ mile long, in the middle part of which are only 18 feet; near each end are 4 fathoms. To the northward of Cadsand Bank, near the edge of the Inner or Rib Bank, is the *Hompel Knoll*, a *narrow spit of sand*, with only 6 feet on it; and has a passage between it and the Staart, of 7, 6, $3\frac{1}{2}$, and 3 fathoms. Between the Hompel and the Cadsand Bank, are 5, 6, and 7 fathoms. Between the Cadsand Bank and the shore, the water is still deeper, but the channel is not above $\frac{1}{8}$ of a mile wide. The whole of this part, from the Wenduin Bank to the Swin of Sluys, is generally known by the name of the Blankenberg Flats. The Swin runs in circularly to Sluys: there is a buoy on the eastern side of the channel, and some beacons on the western side. The town of Cassandria is about 2 miles within the buoy.

From Ostende to the Swin, a *shallow sand* runs along the shore, having 3, 4, and 5 fathoms all the way. This channel is commonly used by the coasting vessels.

The RASSEN is a *large sand-bank*, which lies to the north-eastward of the Raan, and stretches along in the direction of the western shore of Walcheren. Its western part forms the port or eastern side of the Deurloo Channel, which is commonly buoyed. The Rassen has *many patches* of very shoal water upon it; between which are swashways, or passages for small vessels drawing little water; but upon some parts of them the sea breaks. It shoals gradually,

and may be approached, by the lead, both on the north and west sides. The south side is more steep. Its western edge is hard sand. The southern point of the Rassen lies N.W. from the beacon of Flushing, distant 5 miles, and thence extends N.N.W., 5 miles, becoming at its northern part full 3 miles broad. The *Caloo* joins its northern end. At its south-eastern extremity, in $1\frac{1}{2}$ fathom water, West Kapelle Church bears N. by E. $\frac{3}{4}$ E., distant nearly 3 miles.

The ZOUTELAND BANK is a *long narrow ridge*, which stretches off the S.E. part of the Rassen, and runs parallel to the shore, from which it is not $\frac{1}{2}$ a mile distant. Near its S.E. end is a red buoy, in about $3\frac{3}{4}$ fathoms, at nearly $\frac{1}{3}$ of a mile off shore, with Middleburg steeple on the westernmost Kaapduinen, bearing E. 2° S. Nearly opposite Zaalduin, on its inner edge, is a white buoy, called the Roeden buoy.

The DEURLOO CHANNEL is bounded by the Raan and Elboog to the south-westward, and the Rassen to the north-eastward. In time of peace, this channel is regularly buoyed; but during war, the buoys are generally taken up.

In mid-channel, before the entrance of the Deurloo Channel, is the fairway buoy. It is red, and lies in $4\frac{3}{4}$ fathoms, at the distance of $7\frac{1}{4}$ miles N.W. by W. $\frac{3}{4}$ W. from West Kapelle Church. Its marks are, Bruges and Heyst steeples in one S.S.W., westerly; East Kapelle, a little to the southward of Domburg, E. by S.; and Middleburg steeple on the middle of Zaalduin, S.E. by E. $\frac{1}{4}$ E.

The Deurloo Channel is pointed out by six white buoys on the south side, and five black buoys on the north side, marked "D" (for Deurloo), and numbered from the inner ones outward.

The four black buoys, Nos. V., IV., III., and II., lie nearly in a S.E. direction from the red, or fairway buoy; the first, or No. V. (on the bar) at the distance of $1\frac{3}{4}$ mile, in 4 fathoms; No. IV., in $4\frac{1}{2}$ fathoms, nearly a mile from No. V. From No. IV. to No. III. the distance is $1\frac{1}{4}$ mile, in $3\frac{1}{2}$ fathoms, with West Kapelle steeple and mill in one, and Middleburg steeple close to the northward of Zouteland steeple. From No. III. to No. II., the distance is 3 miles; and from thence to No. I., S.E. $\frac{1}{4}$ S., $1\frac{3}{4}$ mile, in 4 fathoms, with West Kapelle on Zaalduin, N. by E. $\frac{3}{4}$ E. At 2 miles from this buoy, in an E.S.E. direction, lies the red buoy, on the south point of the Zouteland Bank.

The outer white buoy, No. VI, lies in 3 fathoms, $1\frac{3}{4}$ mile S. by W. $\frac{1}{4}$ W. from the red buoy, and W.S.W., $1\frac{1}{4}$ mile from the outer black buoy, No. V., with Bruges steeples open to the eastward of Heyst Hill, and Middleburg steeple close to the northward of Zouteland steeple. The next white buoy, No. V., lies in 4 fathoms, S.E. $\frac{1}{4}$ E., $2\frac{1}{4}$ miles from the white buoy, No. VI., and S. by E. $\frac{1}{2}$ E., 3 miles from the red buoy, with West Kapelle steeple, the mill and the black buoy, No. III., in a line, from which buoy it is distant $1\frac{1}{4}$ mile. The white buoy, No. IV., lies in $3\frac{1}{2}$ fathoms, $2\frac{3}{4}$ miles S.E. $\frac{1}{2}$ S. from the white buoy No. V., and $1\frac{3}{4}$ mile W. $\frac{1}{2}$ S. from the black buoy, No. II., with Domburg and West Kapelle steeples in one. The white buoy, No. III., in $3\frac{1}{2}$ fathoms, is 2 miles S.E. by E. $\frac{1}{4}$ E. from No. IV., with Flushing steeple S.E. $\frac{3}{4}$ E. The white buoy, No. II., is $2\frac{1}{4}$ miles S.E. by E. from No. III.; it lies in $3\frac{3}{4}$ fathoms, near the N.W. hook of the Elboog, with Middleburg steeple just open north of Kondekerke. The white buoy, No. I., called the Elboog buoy, lies close to the north side of that part of the sand that dries, and nearly a mile S.E. $\frac{1}{2}$ S. from No. II., with Middleburg steeple on the Galgeschaar, and Flushing steeple bearing S.E. $\frac{3}{4}$ E., distant 3 miles.

The Deurloo is the most difficult to enter of all the channels into the Scheldt, and large vessels must not attempt crossing the Drempel nor bar until half-flood, waiting outside, with Middleburg anywhere on West Kapelle Dyck. The leading-mark through the Deurloo Channel is the Orange Mill, or S.E. mill in Flushing, on with the white Muur bearing S.E. $\frac{1}{4}$ E.

The CALOO BANK begins at the north end of the Rassen. Its N.W. point lies N.W. by N., $4\frac{1}{2}$ miles from West Kapelle Mill; N.W. by W. $\frac{3}{4}$ W., 6 miles from Domburg Church; and E. by N. from the red buoy of the Deurloo Channel, its eastern edge forming the west side of the entrance to the East Gat. From the north-eastern part, East Kapelle steeple appears on the east end of Oosteroog, S.E. by E. $\frac{1}{4}$ E.; and Groede steeple, in Cadsand, on with the eastern part of the wood of Wulpen, bearing nearly S. $\frac{1}{4}$ W.

The KUERENS (sometimes called the Domburg shoal), form an *extensive* and *dangerous bank*, of irregular soundings, of from 2 to 4 fathoms. This bank separates the East Gat from the Room Pot, its northern extremity being about 6 miles N. by E. from West Kapelle Church.

The EAST GAT lies between the two last-mentioned banks. It is the easiest channel to sail through without a pilot, especially with northerly winds. The marks may generally be seen very distinctly; and the course in is S. by W. $\frac{1}{4}$ W., until doubling the point of West Kapelle, when it changes to S.S.E. $\frac{1}{2}$ E., between Zouteland Bank and the shore of Walcheren, this part being called the Zouteland Channel. To avoid the north side of the Caloo, East Kapelle must not be brought so far southward as the south side of Oosteroog; and to clear the Kuerens, Middleburg steeple must not be brought to the eastward of the Graan. At the entrance, in $3\frac{1}{2}$ fathoms water, there is a red buoy, placed to point out the best channel; but this buoy is frequently driven away in stormy weather. Its marks are, Middleburg steeple, on the west part of a sand-hill, called Roggenbrood; and West Kapelle steeple, a ship's length to the westward of Kaaphuis.

Groede steeple, just open of the Point of West Kapelle, is a good mark to enter the East Gat,

in clear weather, until within a mile of that point, when those marks must be opened to give the point a berth. When Domburg steeple approaches East Kapelle, the water deepens to 5 or 6 fathoms; and off West Kapelle to 9 or 10, and one mile farther to 11. After passing that part, the channel becomes narrow, in some parts not exceeding $\frac{1}{3}$ of a mile; but the depths again decrease to 5 and 7 fathoms, after passing the red buoy of the Zouteland Bank the channel again widens and the depths increase to 9 and 10 fathoms, both sides being steep-to.

The BANJAARD is an *extensive flat*, lying off the mouth of the Eastern Scheldt, and to the westward of the west end of the island of Schouwen. Parts dry at low water; but there are several swashways through it, as well as a channel, of 3 and $3\frac{1}{2}$ fathoms, between it and Schouwen. The Banjaard is also separated, nearly in the middle, by a channel, called the Middle or West Gat, within which runs the passage to the southward of West Schouwen; and to the northward of Neeltje Jans and Rogge Plaat, called the Hammen Channel. The south-western part of the Banjaard is a triangular sand, $5\frac{1}{2}$ miles in length, the western point of which stretches towards the Room Pot, and has a buoy upon it, in $1\frac{1}{2}$ fathom water. The northern prong extends to the Middle Gat, and has 2 fathoms over its extremity; while that part of the sand, which lines the side of the Middle Gat, becomes dry at low water, and is called the Noord Land. The north-eastern part of the Banjaard is about a mile distant from the Noord Land, and extends $4\frac{1}{2}$ miles E.N.E., or so far as the entrance of Brouwershaven, running out to seaward full 6 miles. On the southern part of the Northern Banjaard, is a *large patch*, called *Zee Hond Plaat*, which dries at low water. This forms the north-eastern boundary of the Middle Gat. The Zee Hond Plaat is full $1\frac{3}{4}$ mile broad, and $2\frac{1}{2}$ miles long. To the eastward of the Zee Hond Plaat is a narrow crooked part of a *bank*, called the *Krabbe Plaat*, which also dries, and has a channel between of 4 and 5 fathoms; but as you advance to the northward, this passage becomes shallow and too intricate for navigation without a pilot. The Ny or *New Sand* is also a part of the Banjaard, lying at its northern extremity, and forms the south side of Brouwershaven Gat. There are several other parts of this bank which dry; and the whole abounds with shallows and dangers. The passage between it and the Schouwen Shore, called the Krabben Gat, is narrow and hazardous, and fit only for those well acquainted with it.

In coming from the northward, to enter the Eastern Scheldt by the Room Pot, care must be taken to avoid the west and S.W. ends of the Banjaard. The former, in $3\frac{1}{2}$ fathoms, lies with Middleburg steeple half its apparent height to the eastward of East Kapelle steeple; and West Kapelle steeple in one with the first sand-hill to the N.W. of the flat-topped sand-hill Zaalduin. West Kapelle steeple, kept on any part of the said flat-topped hill, will lead clear to the westward of the Banjaard. The S.W. part of the Banjaard, on which there are not more than 2 fathoms, although within it there are 3 fathoms, lies with Middleburg and East Kapelle steeples in one. The mark to clear it is Middleburg on with the wood, seen over the Duins, between East Kapelle and Domburg. This latter mark leads from the Stone Deeps into the Room Pot.

The south side of the Banjaard has three black buoys along its edge. The outer buoy lies in about $4\frac{1}{2}$ fathoms, $1\frac{1}{4}$ mile from the shore, with East Kapelle steeple bearing about S. $\frac{1}{2}$ W. The second and third buoys lie in an E. by S. direction from it. The second nearly 2 miles from the outer buoy, and the third about $4\frac{3}{4}$ miles from it.

About midway between the two last-mentioned buoys, and on the opposite side of the channel, is a red buoy, on the western extremity of the *Onrust*, a *large bank*, projecting $2\frac{1}{2}$ miles from the west end of North Beveland, separating the Room Pot from the Veer Gat. This buoy is rather more than $\frac{1}{3}$ of a mile from the Walcheren shore. The Veer Gat is marked out by black buoys on the east side; and by white buoys and beacons on the west side.

There are also several buoys pointing out the proper channels of the Eastern Scheldt; the black buoys being always passed on the port side, and the white ones on the starboard.

The OOSTER, or EAST BANK.—The western part of this bank lies to the E.N.E. of the northern part of the Banjaard, from which it is distant a mile, with $2\frac{1}{2}$ fathoms upon its outer end, where there is a black buoy. This buoy lies with Renesse Church bearing S.E. by E. $\frac{1}{4}$ E., distant $6\frac{3}{4}$ miles; and Schouwen light S.E. by S., distant $4\frac{1}{2}$ miles. From thence a *narrow* and *shallow ridge*, with from 12 to 6 feet over it, runs E.S.E. $\frac{1}{4}$ E., 5 miles, towards the Middle Plaat, in line with the southern edge of the bank, on which is a depth of 3 fathoms, forming the north side of the entrance of Brouwershaven Gat or Channel. On the south side of the Ooster Bank is a large *shallow flat*, called the *Middle Plaat*, with not more than 6 feet on it, and part of its eastern end dries. To the northward of the Middle Plaat are *several shallow patches*, of 5 or 6 feet water.

Brouwershaven Gat is buoyed off, and forms one of the safest ports on this part of the coast from its extent and depth of water, as described hereafter.

The northern part of the Ooster Bank sweeps round from the outer buoy of Brouwershaven Gat, to the West Gat of Goeree, full 10 miles, and its southern side is bounded by the Ooster Ridge and Middle Plaat. The shoalest part of the bank lies towards its northern edge, some *patches* of which dry at half-ebb. At 7 miles' distance from the downs of Goeree there are from 5 to 10 feet water, and farther westward, from 15 to 18 feet; but near the western end of the Ooster is a small *patch*, which is awash at low water. Along the north side of the Ooster Bank the ground is soft, and the soundings are irregular in many parts, so that it will be dangerous to approach it in the night.

The Springer encircles the west end of the Goeree Island, and forms the N.W. side of Springer's Deep. It is very shallow, and dries at low water.

Between the Banjaard and Ooster Banks is the main channel to Brouwershaven, at the entrance to which are 7, 6, 5½, and 5 fathoms water. The passage is about a mile broad, and the course in E.S.E. On the port side are *numerous shoals;* and the intricacies of the navigation will always require a pilot. The mark for entering this channel, between the black and the white buoys, is Renesse steeple a handspike's length south of the newly-erected mark, called Ooster Doodkist, or the new lighthouses on Renesse in one, bearing E.S.E.

The HINDER is an *extensive bank*, lying immediately before the entrance to Hellevoet Sluys, to the northward of the Island of Goeree, and to the westward of Voorn Island, running off full 8 miles to the westward from the Posthouse on Voorn, forming on its south side, with the strand of Goeree, the West Gat; and on its N.E. side, the North Gat, leading to Hellevoet Sluys.* Near the middle of this bank is a *patch*, which dries at half-ebb, about a mile in length, and nearly 1½ mile from Goeree Island; this is called the Steele Hinder. On the other parts of the Hinder are from 2 feet to 2 fathoms; and to the westward of it, the depths gradually increase to 4 or 5 fathoms. Along its S.W. and south sides are two *long* and *shallow patches*, called the *Bol* and *Hompel*.

The WEST GAT of the GOEREE† has a regular width of about ⅓ of a mile, with a depth of between 4 and 5 fathoms mid-channel. It runs in along the shore of Goeree, on which side there are no other marks than the number of jetty-heads on the beach. But on the north side are three black buoys, Nos. 3, 4, 5, lying in an E.S.E. and W.N.W. direction, in 17 or 18 feet water. No. 5 lies with Goeree Church S.W. by S., and about ½ a mile eastward of the buoy is good anchorage, in from 4 to 3½ fathoms. About a mile E.S.E. of the No. 5 buoy is the passage across the bar, or North Pampas, leading to Hellevoet Roads; this pass is marked out by a *black buoy* on the north side, and a *white buoy* on the south, and between them are 2¼ to 2½ fathoms, deepest near the black buoy. To the southward is the Old Pampas, leading to Hellevoet Roads, where there is a good spacious anchorage, in 8 to 10 fathoms; the tides are strong. Best anchorage is either eastward or westward of the harbour. After passing Kwade Hoek, off which a *shallow spit* extends, on which is a white buoy, the channel takes a S.S.E. and S.E. direction, and is called the South Deep. In this channel are 6 to 9 fathoms, and on the *Scheelhoek Sand*, on the port side of this channel, are 6 black buoys, and a red buoy. The Old Pampas is often preferred, as the flood-tide is more favourable.

The SLYK GAT lies to the northward of the Bol and Hompel, and has four buoys on the Goeree side. The outer buoy is red, and lies in 16 feet at low water, with Goeree Church close to the north side of Jan Paulus's house, bearing about S.E. by E. ½ E.; the church distant 5 miles. The next buoy, white, lies E. by N., a mile from the outer red buoy; the third buoy, white, lies E.S.E., 1¼ mile from the second buoy, in 15 feet, with Goeree Church and the Stone Beacon in a line; the fourth buoy is red, and moored near to where the Slyk and West Gat joins. On the north side of the channel are two black buoys, the outer buoy lies in 2¼ fathoms, with the mast-beacon and Goeree Church in one; the second black buoy lies in 11 feet, a mile within the outer buoy, and opposite the inner red buoy; between the latter buoys is the shoalest part of the channel, or bar. The Goeree Stone Beacons are now lighted, and with the coast light of Goeree, forms a leading-mark to find the entrance to the Slyk Gat.

An iron black-painted beacon-buoy has been placed nearly 1¼ mile outside, and in the direction of the black buoys at the mouth of the Goeree.

The MAAS SAND extends westward from the Hock, or Hook of Holland, and forms the east side of a channel leading into the Maas, named the *Vlakte*, or *Brielle Gat*, and the *shoal*, called the *West Plaat*, forms the west side; this channel has only 7 or 8 feet water in it, and is buoyed off by three black buoys on the east side, and three white buoys on the western side; this channel leads into the Spleet, near the Maas light. The Maas River is narrow and intricate, and not to be ventured without a pilot.

The SPLEET.—The new channel into the Maas lies N.W. by W. from the Maas light, and commences at the outer black beacon buoy of the Northern Gat, and is called the Spleet. This channel is marked out by 3 black buoys on the east or port hand when going in, and 4 white buoys on the western or starboard side. The two outer buoys, the black beacon-buoy, and white one opposite (as before described), lie in 2½ fathoms, at the mouth of the Northern Gat, and are without numbers; at about a mile south-eastward of the outer buoys is the bar, with 7 feet on it, and ¾ of a mile across; having passed the third white buoy, you can anchor in 13 or 14 feet, abreast the Maas lighthouse.

---

* The North Gat, formerly a good passage for vessels from the North Sea, has so much grown up of late years, as to be unfit for ships, consequently the buoys have been taken away, except the two outermost at the mouth, which serve to mark the entrance of the Spleet, and are not numbered.

† The West Gat of the Goeree having its outlet between the Goeree shore, and the *Hompel* and *Bol*, having lately become impassable, by its great decrease in the depth; to enter it now, all vessels must pass to the north of these shoals through the Slyk Gat.

DIRECTIONS FOR SAILING FROM OSTENDE TO THE RIVERS SCHELDT, MAAS, &c.

OSTENDE to SLUYS.—In proceeding from Ostende for the Swin of Sluys keep along shore, within the Wenduin Sand, in 3, 4, or 3½ fathoms; and when you find yourself to the eastward of Blankenberg, you may keep more in-shore, and proceed near it, in 3, 4, or 5 fathoms, until you come to the buoy at the entrance, which, in going into the Swin, must be left on the port side. Between Ostende and Sluys there is but one spire-steeple, which stands near the latter place, with a square steeple betwixt them. When the spire-steeple comes between two sand-hills, and the square steeple is on with a large sand-hill, which lies to the eastward of the others, with a windmill standing between, you will be abreast of the buoy. The town of Sluys bears from the buoy S. by W. From the buoy you must steer right in for the bluff part of Cadsand, your course in being nearly S.E., and then along shore to the southward. From the buoy to the town of Sluys the distance is nearly 4 miles.* To enter the Sluys, a pilot is always necessary, as the sands at the entrance frequently shift.

WIELINGE.—If desirous of going from Ostende Road through the Wielinge, run along the shore, at the distance of 1½ mile, in from 4 to 3 fathoms, leaving the Wenduin Bank to the northward, until Bruges steeples come on with Blankenberg. Then haul off E. by N. until Flushing steeple bears E. ¾ S. when you will be in the Wielinge, and in 4½ and 5 fathoms water; continue on that course until Cassandria steeple bears about S. by E., you will then be near to the light-vessel moored off the N.W. part of the Paarde Markt.

Beware of the Sluys and Cadsand Banks, going on either side, as most convenient; and having passed them, steer right on for Flushing. The mark for passing between the white buoy on the west end of the Cadsand Bank and the three black buoys of the Hompel, in 6 or 6½ fathoms, is the Orange Mill in one with Flushing light-house E. ¼ S.

A large vessel, from the northward, should bring Bruges steeples on with Lucifer's Duin, bearing S. ¼ E. This will lead to the outer buoy of the Wielinge, which may be passed on either side; and when Flushing steeple comes E. ¾ S., steer up the channel, as before directed.

SPLEET CHANNEL.—If coming from Ostende Road and you are to the northward of the Wenduin Bank, when Blankenberg Church bears S.E., and Ostende S.S.W. ½ W., in 7 or 8 fathoms, steer E. ½ S. This course will carry you into the Spleet Channel, to the northward of the inner banks. In this passage there is a good depth of water; but it requires great skill and care to navigate, on account of its narrowness. The leading-mark for sailing through the Spleet, is Middleburg steeple on with west Kaapduin, bearing E. ¼ S., nearly. When to the northward of the Elboog, steer south-easterly for Flushing Roads.

The DEURLOO CHANNEL.—Vessels coming from sea for the Deurloo Channel, or the Eastern Scheldt, commonly proceed between the Thornton's Ridge and Rabs; or between the Rabs and the Stone Banks. To sail between the Thornton's Ridge and Rabs, you should bring West Kapelle Church S.E. by E. This will carry you clear to the northward of the Thornton's Ridge, and to the southward of the Rabs. Having passed the latter, steer a little more to the southward, and you will reach the outer buoy of the Deurloo. To sail in to the north-eastward of the Rabs, bring West Kapelle to bear S.E. ¼ S.; this will carry you to the south-westward of the South Stone Bank: and when Heyst Church comes on with Bruges steeples, steer south-westerly for the outer buoy; but should you be desirous of going to the southward of the West Hinder, after passing it about 3 miles to the southward, your course should be E. ¼ S., until you arrive at the outer buoy. In this track you will pass to the southward of the Thornton's Ridge; and as soon as you perceive the Island of Walcheren, bring West Kapelle a sail's breadth open to the northward of the high sand-

* For the distinguishing marks of the Belgian pilot-boats, see page 97.

hills, bearing S.E. by E. $\frac{3}{4}$ E.; proceed in that direction until Heyst and Bruges steeples come in one: you will then be near the outer buoy of the Deurloo. Having reached the buoy, a S.E. by S. course will carry you between the Raan and Rassen Banks, until the Orange Mill in Flushing (which is the S.E. mill) comes on with the White Muur, bearing S.E. $\frac{1}{4}$ E., which marks will lead you through the whole of the channel. The buoys will then be your best guide. If they should be removed, proceed, as before directed, towards West Kapelle, until the steeples of Bruges appear $\frac{4}{5}$ths of the distance from Leiswegen towards Heyst; then, making proper allowance for the tide, steer S. by E. $\frac{1}{2}$ E., until the S.E. mill at Flushing comes on with the small steeple, which is to the southward of the large steeple, and bears nearly S.E. $\frac{1}{4}$ E., or the Orange Mill and the White Muur in one, S.E. $\frac{1}{4}$ E., which is the best leading-mark. Keep it in this direction, which will lead abreast of Dishoek's signal-post; then steer directly for Flushing, and anchor about $\frac{1}{2}$ a mile to the southward of the jetties.

In working in, you should tack on the north side of the channel, when the above mill becomes twice its apparent breadth open to the southward of the great steeple; and on the south side, when the mill appears midway between the small steeple before mentioned, and another small steeple to the southward of it (these steeples being but little above the tops of the houses); the mill will then be on with a white mark in the wall of the town. To go farther up the river a pilot is indispensable.

When coming from the southward for the Deurloo Channel, and the weather be clear, you may run along the Raan, in 6, 7, and 8 fathoms, keeping Bruges steeples full $\frac{3}{4}$ from the Heyst, towards Leiswegen, until West Kapelle Church appears a sail's breadth open to the northward of the high sand-hills, bearing nearly S.E. by E. $\frac{3}{4}$ E.; then steer towards it, in that direction, to the outer red buoy, from which proceed as before directed.

Although the above directions, in cases of necessity, may be useful, it is not advisable to enter the Deurloo Channel without an experienced pilot. The new regulations oblige the pilots to be always on the look-out.

EAST GAT.—To sail for Flushing, through the East Gat and Zouteland Channel, you may steer with West Kapelle S.E. $\frac{1}{4}$ S.; this will lead clear to the westward of the South Stone Bank; and having passed this bank, steer S.E. by E. $\frac{1}{2}$ E., which leads to the northward of the Caloo, and up to the outer, or red buoy. When in the Stone Deep, the mark to find the outer red buoy is Middleburg steeple on with Ruggenbrood. Then bring the mill, westward of West Kapelle, to bear nearly S. $\frac{1}{2}$ W., and sail directly towards it; or, in clear weather, you may bring Groede steeple, in Cadsand, just touching the point of West Kapelle, to which you should give a good berth in passing; you will thus pass between the Caloo and Kuerens, and be in a fair channel, in the best water. You must now steer along shore, within 2 cables' length of it. The in-shore side is steep, the water deep, and the north side of the Caloo is flat. Continue to steer along the shore to avoid Zouteland Banks. These begin near the mill, and run along parallel to the land almost as far as Dishoeks Signal. When you have advanced thus far, you may run on near the shore, to the south-eastward, for Flushing Road.

Flushing Road lies between the town and the western part of the Caloo, and has good anchorage, in 9 or 10 fathoms; but in some parts there is deeper water. Gales of wind from the westward send in a heavy sea, which compels vessels to seek shelter higher up. Small vessels may find good riding inside the point of the Caloo, to the eastward of Zuidwatering; but large vessels must run up the river, and seek shelter before Terneuse. On the N.W. end of the West Kloot is a black buoy.

On the 6th July, 1841, the Minister of Marine and Colonies gave notice, that in the middle of the channel of the roadstead of Flushing, a *shoal* had formed itself, of about 2 cables' length, in a S.S.W. and N.N.E. direction, which has been marked with a red buoy, placed at the following bearings, taken by compass, viz.:—The steeple of Middleburg N.E. $\frac{1}{2}$ N.; Fort Nellen N. by W.; the steeple of Hoofd Plaat S.E.; and the Mill of Briskins S.W. $\frac{1}{2}$ S., in a depth of 12 English feet at ordinary low water. It is to be observed, that at the distance of 2 cables' length north and south of this shoal, there is sufficient water for ships of any draught to pass without the least danger.

The VEER GAT.—Vessels coming from sea, and bound for Ter Ver, should

pass between the Stone Banks, bringing Middleburg steeple on with Domburg steeple, bearing S.S.E. ½ E. When within the banks, haul to the S.E., about ½ or ¾ of a mile, and anchor in the Stone Deep, in 10 or 12 fathoms, good holding ground.

ROOM POT.—In proceeding from the above anchorage for Room Pot, steer S.E., eastward, until Middleburg spire draws near to the west end of a long wood, seen over the hills between East Kapelle and Domburg; or do not come into less water towards the Kuerens Bank than 5 or 6 fathoms, until they are in one; they will then bear about S. by E. ½ E. Steer in that direction, until West Kapelle Mill appears to the eastward of the Hakkelingen sand-hill, bearing about S. W. ¼ S.; the course from thence will be about S.E. by E. to the Veer Gat.

In working in, the flat or shoal on the south side, as far in as Ooster Oog, will be avoided, by keeping a barn near the N.W. point of North Beveland open of the main shore of Walcheren, bearing about E.S.E. On the north side there is no other guide than the buoys and the lead.

Having entered the Veer Gat, between the red buoy of the Onrust and the Bree Sand, the course towards the first black buoy is about S.E., until about midway between it and the white buoy opposite: it then becomes more southerly, till the steeple of Arnemuiden comes on with the watch-house on the corner of the dyck. This mark will lead close to the eastward of the white buoy on the N.E. point of the Scotchman, and also clear, but too close to the north black buoy of the Ruiten Plaat. It is, therefore, advisable to keep nearer to the beacons than to the buoy, and to steer abreast of the south white buoy directly on towards Ter Veer, keeping very close to the shore, until abreast of the town, and then anchor, or proceed onward in the same manner to the entrance of Middleburg.

The Veer Gat is narrow, on account of the *banks* with which it is encumbered, particularly between the spit of the Ruiten Plaat and the Scotchman, which is also very shallow at low water.

In sailing from Room Pot up the Eastern Scheldt, it is necessary to observe, that the black buoys must all be kept on the port hand, and the white buoys, so far up as the Vuilbaard, on the starboard; but the white buoys of the Vondelingen Plaat and the Middle Plaat on the port.

We have already stated, that the Banjaard Sand is divided, having a channel passing through its middle part, called the Middle or West Gat, and leading to the northward of the Nealtje Jans and Rug Plaat, towards Zierickzee; but as these sands frequently shift, and the channel is constantly varying, we forbear giving any further description. There is also a narrow passage which runs along the western shore of Schouwen, frequented by the natives, but totally unfit for strangers to venture through; indeed, the whole of these passages into the Scheldt require a pilot, without the assistance of whom they should not be attempted.

BROUWERSHAVEN.*—Vessels coming in from the northward, when they arrive at the parallel of Schouwen, will be within sight of the Island of Walcheren, which may be easily known by its steeples, and the island of Schouwen to the eastward.

Brouwershaven Gat is buoyed off, and forms one of the safest ports. From its extent and depth, ships are enabled to get to sea, even with easterly winds; so that in the event of ice, they are, comparatively, not much endangered.

There are eighteen buoys at the entrance of the Brouwershaven Gat, viz.:—Eight black buoys along the southern edge of the Ooster Sand, Middle Plaat, and Plaatjee; and four black buoys along the Hompelvoet and Paardeplat, all of which must be left on your port hand when going in, and five white buoys to be left on your starboard hand; also a wreck buoy, which is the outermost, and with the first four white buoys lies on the northern edge of the Banjaard, and the fifth on the Scaar of Renesse, near the lights; and there is also a red buoy near the west end of the Darsin-

---

* Pilots for Brouwershaven may be found off Dungeness, in boats, cutter-built and rigged, and also off Brouwershaven Gat, in flat-bottomed boats, sloop-rigged, with the words "Goeree Maas and Brouwershaven," painted in large letters on the main-sail, when in company with other pilot-boats, they always show a blue flag, with a white number on it, and a broad Dutch flag from the gaff.

denweg, the latter lies 4 miles above Renesse. These buoys lie in from $3\frac{1}{4}$ to 5 fathoms water.

Vessels bound to Brouwershaven must endeavour to ascertain their position by the great coast light of Schouwen, which is now an excellent mark, and the light may be seen, in clear weather, 24 miles.

It will be seen by an inspection of the chart that the *Schouwen* and *Middle Banks* lie much in the way of large ships approaching Brouwershaven from the northwestward; the former has a *patch* of 4 fathoms, and the latter a *patch* of only 3 fathoms, which must be avoided in large vessels.

To pass from the north-westward across the shoalest part of the Schouwen Bank in 4 fathoms, at low water, should your vessel's draught of water allow you to do it, you must bring the coast-light on Schouwen to bear S.E. $\frac{1}{2}$ E., and keeping it in that direction you will pass to the northward of the N.E. end of Middle Bank, having a *patch* of 3 fathoms on it. In a large vessel you should bring the Schouwen coast light to bear S.E. $\frac{3}{4}$ S., this will lead you across the N.E. end of the Schouwen Bank, in 6 and 7 fathoms at low water, and right up to the outer black buoy on the north side of the entrance to Brouwershaven Gat; from the Schouwen Bank to the outer buoy you will have from 11 to 14 fathoms water.

At night, with the coast light bearing S.E. or S.E. $\frac{1}{2}$ E., is a sure guide to bring the two lights at Renesse in a line. Coming in on this point of bearing, the lowest light of Renesse may be seen at 5 miles from the outer black buoy, and the light on Goeree Church, when you are about 4 miles from the said buoy will heave in sight. When you get the Renesse lights in one, bearing E.S.E., you will have the channel fairly open, and may steer directly for them, and pay particular attention to keep the lights in one, for when in the channel the greatest part of the flood sets towards the Banjaard; and the ebb-tide sets towards the Ooster Sand. Goeree light will disappear while passing on to the eastward of the outer black buoy, and will serve as a mark for having passed within the mouth of the channel.

When running in with the Renesse lights in one, you will see the small light of Verklikker, when you are as far as the third black buoy up the channel, bearing about S. by E. and be prepared to down anchor as soon as you have the Verklikker light in a line with the revolving coast light; here you will have about 5 fathoms water.

N.B.—Should the pilot-boats be missed, the life boats are generally on the look-out, having "Zuid, Hollandsche Redding-Maatchappy," painted on their mainsail, and carry a red flag with a white ball in the centre, to distinguish them from the wreckers, and others. The proper signal for a steam-tug is two flags, 4 feet above each other at the maintop-mast head.

When coming from the westward for Brouwershaven with a N.W. wind, and intending to steer right across the Schouwen and Middle Banks, you should bring the coast light to bear E.S.E., steer towards it on that course till the light of West Kapelle bears S. by E: then steer E. by S. which will lead you over the Middle Bank, in 6 fathoms, taking care not to bring Schouwen light to the southward of E.S.E. $\frac{1}{2}$ S. until you are sure by the soundings, or by having West Kapelle bearing S.S.W., that you have crossed the Middle Bank; you should then continue your E. by S. course, but be careful when approaching the Banjaard side, not to come into less than 10 fathoms, until you get Renesse leading lights in one.

Tides.—It is high water, full and change of the moon, at 2 o'clock in Brouwershaven Roads; spring-tides rise 10 feet, neaps $8\frac{1}{4}$. At the outer buoy it is high water at 1 o'clock, and in the offing at 12h.; the tides run regularly, 6 hours each way, both at sea and in the river. When it is near high water in the North Sea, the tide begins to set easterly up the Gat, therefore you can only beat up about 2 hours before it is high water at Brouwershaven.

Ships lying off, the new coast light on West Schouwen must be brought between S.E. and E.S.E.; and if lying to the southward, they must not near the Banjaard after Goeree steeple bears east.

Springer Deep is a channel leading from Brouwershaven Gat to Goeree shore; and the Vlieger is a channel leading from Brouwershaven Roads, to the said Goeree shore. The requisite buoys have been placed for navigation. Should the wind not be fair it is recommended never to enter without a pilot. Observe, that the outer black buoy off Brouwershaven Gat bears N.W. by N., distant $4\frac{1}{2}$ miles from Schouwen new lighthouse;

HELLEVOET SLUYS.—Ships bound to Rotterdam, may reach it either by the Goeree Gat, towards Hellevoet Sluys, and through the canal of Voorne, or by steering straight for the Maas, between the Voorne and the Hook of Holland. In the Goeree Gat, in the best channel, is 12 or 13 feet, but on the Maas Flat, or *bar*, there are only 6½ or 7 feet at low water; the tides rise from 5 to 5½ feet.

There were three channels leading to Hellevoet Sluys, the West Gat running along the island of Goeree, the Slyk Gat, on the north side to the Bol and Hompel, and the Northern Gat along the Island of Voorne. But ships of heavy burden generally go first to Brouwershaven, and there discharge part of their cargo, and then proceed to Rotterdam.

Vessels entering by the *Slyk Gat*, or Goeree, which is the only one now fit for large ships, bring Goeree Church to bear S.E. and S.E. by E., and keep it so while standing in till you are in 9 or 8 fathoms, in what is called the *Bowl;* here you may anchor in 11 to 9 fathoms, if you have to wait for a pilot, tide, or steam-tug. If you keep off and on until tide time, the marks must be strictly attended to; when the ship's head is to the southward, Goeree Church may be brought in a line with Jan Paulus's house, and with your head to the N.E., you may bring the church a handspike's length to the east of the stone beacon, but no farther.

The SLYK GAT.—This channel is marked by black buoys on your port hand, and white buoys on the starboard, as before described. In sailing up the Slyk Gat, there are now two different leading-marks between which you must choose accordingly as you have the wind. If it blows strong from the northward, the best mark is, to keep the mast-beacon in a line with Goeree Church bearing S.E.; this mark will lead you fairly in from the outer black iron beacon buoy, to past the red buoy, No. 4, and into the West Gat.

You must not adopt the foregoing marks with a southerly wind, as the flood-tide, if setting strongly towards the E.N.E., as it does beyond the depth of 5 or 6 fathoms, might carry you to leeward of the channel entrance; therefore, when approaching the Slyk Gat with a southerly wind, you must keep the stone-beacon and Goeree Church in a line, and when in 3 or 4 fathoms, and nearing the Hinder, then edge away E.S.E., so as to join by degrees the former leading-mark, viz., the mast-beacon on with the Church of Goeree, which will bring you into the West Gat, as before.

It will be necessary for you to alter your course to E.S.E. in time, when running into the channel, with the stone-beacon and church in one, for if you keep these marks on until past No. 3, white buoy, you would run aground on the east end of the Bol.

You will easily know by the lead when you are past the No. 4, red buoy, as you will have twice the former depth as soon as you are in the West Gat; after which the shore will be your best guide, leaving three more black buoys; Nos. 3, 4, and 5, on your port hand. When past the fifth black buoy, you may anchor off the *Kwaden Hock.** There is a white buoy on the Kwaden Hock, which must be carefully avoided when the flood-tide runs strongly, by passing close to the black buoy, No. 5, and immediately haul to the eastward till full ½ a mile from the Goeree shore. A stranger should not enter the Goeree Gat without a pilot; but in case of emergency, by strict attention to the marks, and the lead, he might bring his vessel in as far as the anchorage above the fifth black buoy; here you would soon obtain a pilot, or any further assistance, by making a signal.

Having brought Goeree Church in a line with the high downs, or sand-hills, near the entrance of Goeree Canal, steer S.S.E. ½ E. into the Zuyder, or South Deep; but keep the Scherm, or mark near the channel to Middleharnis, always to the southward of Pieter beacon, to avoid the Scheelhoek Bank. Keep on thus, until you bring Brielle Church upon a line with the stone-head of De Kwak, on Voorne Island; and from this point, steering E. ½ S., you will pass over the Old Pampas, in the deepest water upon it, and in the narrowest part. You will be upon the edge of it, when the Scherm appears to the northward of Pieter beacon; and over it, when Oudenhorn Church disappears behind the houses of Hellevoet Sluys; you may then safely steer E.S E., or in a direct line for Hellevoet Harbour or Road.

To pass from the WEST GAT to Hellevoet Road, by the North Pampas, to the northward of the Scheelhoek, where there is more water than over the Pampas, pro-

* *Kwaden Hock*, or *Bad Point* (on the extreme of which is a white buoy), is a *dangerous spit of sand*, which runs off from the point eastward of the town of Goeree, and it requires great care to clear it, in coming from the westward, with a strong flood-tide.

ceed up the West Gat, as before, until you bring Goeree Church open of the eastern-most of the jetty-heads; then steer E. by S., and you will pass between a red buoy on your port hand, and a white buoy on your starboard, till you bring Hellevoet Church upon the white strand path, just to the westward of De Kwak. Then bring the church gradually nearer to the stone-head of De Kwak, till Goeree Church is brought in a line with Ouden Oostdam (a farmhouse at the side of Goeree Canal), when you may steer right on for De Kwak, until you come into the deep water of the North Channel, and then proceed for Hellevoet Road.

The ENTRANCE to the RIVER MAAS, which leads to Rotterdam, lies in lat. 51° 57′ north, and is commonly called the Brielle Gat, or Flats, on which are 7½ feet at low water. In entering the Maas by this passage, you have the black buoys on your port, and the white buoys on your starboard. Bring Brielle Church steeple S.E. ¼ S.; continue on this mark, decreasing your depth of water, you will get sight of Zeeborg, on the shore of Voorne, and when brought in a line with Brielle Church steeple, will lead you into the fairway between the two outer buoys, black, on the port, and white on the starboard, both being in 11 feet water. You will now have Maas lighthouse S. by E.; steer for it in this direction, and it will take you across the *Flats*, or *Vlakte*, into the pit off the lighthouse, where you may anchor.

Observe.—The Maas lighthouse shows a white light, between the direction of north and N.N.W., visible 8 miles, as a guide to vessels entering by this channel.

The Spleet Channel lies to the southward of the West Plaat, and marked out by black buoys on the port hand, and white buoys on the starboard. The outer black beacon-buoy and outer white buoy are also the outer buoys of the Northern Gat to Hellevoet Sluys, and are not numbered. In coming from the westward for the Spleet Channel, you should bring Brielle Church* a little to the southward of the Maas lighthouse, bearing S.E. by E. ¼ E., will bring you close to the outer white buoy; this buoy lies in about 16 feet water. As soon as the Pesthouse on Voorne comes on with Rokanje Mill, which stands a little to the eastward of the town, you are near the edge of the *bar*, and also near the black buoy No. 1; now you must run in with this latter mark, until the hollow in the Downs appears between the steeple of Maasland and the stone beacon, near Brielle; and following this mark, it will lead up the channel into the Pit, where you can anchor northward of the Maas lighthouse. From thence to Brielle, the channel is clearly shown by the black buoys on the north, or port hand, and the shore on the south, or starboard hand. Although the entrance into the Maas is shallow, it affords an expeditious entrance, and exit, for steamers and small craft, and saving the expenses of the Voorne Canal. The Maas lighthouse shows a red light, between N.W. and W.N.W., towards the Spleet, visible 4 miles.

When entering the Maas, or Goeree Gat, the time of tide ought to be well considered, so as not to run for the *bars*, until the tide has flowed sufficiently; but when a westerly gale has been blowing two or three days, the tides are kept pent up in the rivers, so as scarcely to fall anything during the ebb.

TIDES.—The times of high water, and the rise of the tides, at the full and change of the moon, are as follow:—

At Calais it is high water at 30 minutes after 11 o'clock; spring-tides rise from 16 to 19 feet, neaps from 14 to 15 feet. At Gravelines and Dunkirk, at 11h. 55m.; spring-tides rise from 16 to 19½ feet, neaps from 14 to 15 feet. At Nieuport, 12h.; spring-tides rise from 15 to 18 feet, neaps 14 to 15 feet. At Ostende at 20 minutes after 12h.; spring-tides rise from 14 to 16 feet, neaps 12 to 14 feet. At Flushing and Veer, at about 20 minutes past 1 o'clock; spring-tides rise 13 feet, neaps from 10 to 11. At Terneuse, at 2h. At Bathz, at 3 o'clock; spring-tides rise from 13 to 14 feet, neaps from 11 to 12. At Antwerp, at 25 minutes after 4 o'clock; spring-tides rise from 12 to 14 feet, neaps 11 to 12 feet. At Camp Veer, at ½ past 1h.; spring-tides rise from 17 to 18 feet, neaps from 11 to 12 feet. At Brouwershaven, at 2 o'clock; spring-tides rise 10 feet, neaps 8 feet. At the entrance of the West Gat, at Goeree, at ¾ after 1'clock. At Hellevoet Sluys, at 2h. 30m.; spring-tides rise 8 feet, neaps 6 feet. At Brielle Bar, or Flat, at 2h. 30m. At the Brielle, at 3 o'clock; springs rise 6 feet.

---

* The light formerly shown from Brielle Church has been discontinued; but the harbour light at Brielle continues, and is shown during moonless nights only.

Remarks on the Tides from Calais to the Maas.

The rise of the tides on the coast of Flanders is very irregular, and much dependent upon the moon's age, and the strength and direction of gales of wind; thus, with easterly winds, they will rise and fall 3 or 4 feet more than with westerly winds. In general they will, at the end of 3 hours' flood, have risen one-third; that is, if the tide commonly rises 13 feet at high water, at half-flood it will only have risen 4 feet above the low water mark. Between the 3rd and 5th hour, the rise becomes very considerable, and from the 6th hour it gradually diminishes.

The ebb-tide falls half its quantity between 3 and $3\frac{1}{2}$ hours after high water; it then falls gradually to the 5th hour; and, during the last hour of ebb, its decrease will scarcely be perceptible.

With spring-tides, the stream runs from $3\frac{1}{2}$ to $4\frac{1}{2}$ knots; and with neaps, from 2 to 3 knots. The general direction of the stream is east and west, the first of the flood inclining towards the shore, and the first of the ebb towards the offing.

At the entrances of the Scheldt, the current runs in the direction of the various channels, except where there is deep water over the banks. Both flood and ebb will continue running in the offing, full 2 or 3 hours after it is high or low water on the shore, a circumstance which, in crossing the banks, should be particularly attended to; therefore the time of high water must be calculated without attending to the current, or you may mistake for the time of high water, the period when it has fallen 4, 5, or 6 feet on the banks.

At the East Gat of West Kapelle, the first of the flood sets to the southward, and the middle and the after parts right inward, through the East Gat. The first of the ebb sets very strongly to the northward, and the middle and after parts set right out through the east entrance. When the flood begins to run at sea, it is the first of the ebb in the East Gat; and when the ebb begins to run at sea, it is the first of the flood in the east entrance. At the outer buoys of the Deurloo Channel, the first of the flood sets strongly to the southward, the middle part S.E., and the latter part right in through the channel; the ebb sets in contrary directions. The flood-stream along the coast runs nearly in the direction of E.N.E., till opposite Brielle Bar, when it runs N.E., following the bend of the Hook of Holland.

Before Goeree Island, the first half of the flood sets off shore; but before the Maas River, it sets on the shore, except with southerly winds, when it sets off for the most part; so that, with a strong breeze from that quarter, the buoys upon the shoals of the Maas hardly change their north-easterly drift or swing.

In the channels between Goeree and the Hook of Holland, the flood in common tides runs but little more than 4 hours, while the ebb runs nearly 8. With the flood, the water continues to rise about 3, and with the ebb to fall about 7 hours, remaining for the rest of the time nearly at a stationary level.

Before Goeree Island, with quarter moon, the tide usually rises about 5 feet 7 inches, but on the Brielle Bar, 6 feet; and upon an average, it does not rise, during the first hour and-a-half of the flood, about one-fourth of its whole height, attaining its highest point in the next 2 hours, and remaining nearly at that level till the ebb runs through. During the first 2 hours of the ebb, it falls at the rate of 10 inches in each hour; after which it continues to fall about a foot in the same space of time, till towards the last of the ebb, when it again diminishes to 10 inches per hour.

Before the banks of Schouwen and Goeree, the tide turns about with the sun. The after-flood sets into the channels, and then bends to the southward till the running of the ebb; but the ebb runs right out to sea, and the first flood sets a short time to the northward.

By attending to the current when off the coast of Holland, in calm weather, and out of sight of land, it may easily be perceived whether you are to the northward or southward of the Maas; for, to the northward of the Maas, the stream of flood turns about with the sun, but to the southward, against the sun, till the last quarter-tide, and then it sets in towards the land.

FROM THE MAAS TO THE TEXEL.

Description of the Coast.

FROM the Hook of Holland to the Texel the land is level and low, but abounding everywhere with small white sand-hills; and the coast is so clear from dangers, that you may run along it all the way, in 5 or 4 fathoms. The land contiguous to the coast is distinguished by the following towers, churches, lights, and beacons; but the beacon-lights of Katwyk, Noordwyk, and Zandvoort, are only occasional lights, intended principally for the use of the fisheries.

Gravesande lies about N.E. from the Hook of Holland, and formerly had a high spire-steeple, which is now pulled down. Near Gravesande is Hogewoerd, Munster, and Ter Heide. At 4 miles to the north-eastward of Gravesande, you will see, about $1\frac{1}{2}$ mile inland, the square steeple of Loosduinen, having a small turret upon it, and near the shore a white sand-hill, rather more elevated than the others.

SCHEVENINGEN.—Almost 4 miles from the Loosduinen, but near the shore, is Scheveningen, a fishing-town, having a great number of boats belonging to it, with one church and a little spire-steeple, the land about it appearing in small hummocks. At Scheveningen is a fixed light, placed on a stone tower, erected on the downs, southward of the village and near the beach, in lat. 52° 6′ 16″ north, and lon. 4° 16′ 20″ east. It is 95 feet above high water mark, visible at the distance of 4 German, or 16 English miles, from north to west. This place may readily be known by the steeples of the Hague, which are situated $2\frac{1}{2}$ miles inland, one of them being large and square, with a spire on its top.

At $7\frac{1}{4}$ miles beyond Scheveningen is Katwyk-aan-Zee, lying on the edge of the shore, distinguished by one large church, with a small spire-steeple, and a fixed light, visible 6 miles, for the use of the fishermen. A little to the southward is a beacon, appearing at sea like a steeple. Between Scheveningen and Katwyk, the steeples of Wassenaar, Valkenburg, and Katwyk Binnen will be seen. A little to the northward of Katwyk-aan-Zee is the entrance of the canal, which runs to Leyden. Nearly 3 miles beyond Katwyk is Noordwyk-aan-Zee, having a large steeple and small spire. Just to the northward of Noordwyk is a light-beacon. About a mile inland is Noordwyk Binnen, having a church, with a square steeple. There is also a small tower, apparently standing on the middle of the Church. At $2\frac{1}{2}$ miles to the north-eastward is Noordwykerout, situated $1\frac{1}{2}$ mile inland. There is also a small place farther northward, but nearer the coast, called Langevelder Kapelle. Zandvoort is about $8\frac{1}{2}$ miles from Noordwyk, and has a tall spire-steeple and a light-beacon near it. When opposite this place, you will see a large house, with a barn close to it, and to the southward a hummock, appearing somewhat like a beacon. Sand-hills continue all along the shore.

About 8 miles beyond Zandvoort is Wyk-aan-Zee, having a church with a square steeple, and a sand-hill close by the shore, which appears higher than any of the other land thereabout. When the steeple and this sand-hill are in a line with each other, the former seems to stand on the latter like a lighthouse. The land here appears double, with white sand-hills somewhat higher than the land to the southward. It is distinguishable, when coming in from the sea, by Haarlem Church, which stands at some distance inland, with a spire-steeple in the middle of it; also by Beverwyck, which lies 6 miles north of Haarlem, with a spire-steeple, high, and somewhat bluff.

The adjacent land, near Wyk-aan-Zee, is low, with some scattered sand-hills. Inland you will perceive the three churches of Egmond Binnen, Egmond-op-de-Hoef, and Hyloo, one of these being large. At $4\frac{1}{2}$ miles inland, stands the city of Alkmaar.

EGMOND-AAN-ZEE.—At $7\frac{3}{4}$ miles from Wyk-aan-Zee, is Egmond-aan-Zee, where there is a bluff square steeple, and two light towers standing close to it; they stand in lat. 52° 37′ north, and show two fixed lights, 120, and 125 feet above high water level, and visible 16 and 18 miles, from N. by E. round westerly to S.S.W.; they bear S.S.E. $\frac{3}{4}$ E., and N.N.W. $\frac{3}{4}$ W. nearly from each other, distant 408 yards. As the whiteness of the sand-hills prevents the lighthouses from being plainly seen, a *wooden beacon* has been erected on one of the highest sand-hills, the head is 80 feet above the tops of the light towers, rendering the land near Egmond the most conspicuous of any between the Maas and the Texel.

CAMPERDOWN.—About 6 miles to the northward of Egmond-aan-Zee, is Camperdown, or Schoorldown, the highest land on the Dutch coast, it being a large sand-down, which, at a distance, appears in hummocks, and may be seen, in clear weather, when in 14 fathoms water, at the distance of 20 miles.

The churches of Schoorl, Groet, and Kamp lie adjacent; and to the northward, 9 miles from Egmond, is the town of Petten, the church of which has the appearance of a barn, when viewed from either the southward or northward; but when abreast of it, the steeple is pointed, and seems to be built on the middle of the church. Petten appears in hummocks, and has several

mills about it. Close to the town is a sand-hill, upon which you will see a large building like a lighthouse. At 2 miles to the W.N.W. of Petten, is a *shoal*, lying near the shore, and called the *Polder*, with 2 fathoms water; it is about 2 miles long by $\frac{1}{2}$ a mile broad, running nearly parallel with the coast; there is a channel between, a mile wide, with 17 feet in it. It has 9 fathoms close to its outer edge.

Calandsoog.—About 4 miles northward of the village of Petten (where there is a wide gap in the downs, which, at a distance, looks like an opening in the land) is the village of Calandsoog, having deep water close in shore; this latter village is seen through an opening in the downs, and when the steeple is brought to touch the southern slope of the sand-hills to the northward of the village, it gives a good leading-mark for rounding the *Haaks Sands* to the westward.

At 4 leagues to the northward of Petten is Kykduyn, which is a high white sand-hill. Near it is a fort and lighthouse. The latter exhibits a strongly-reflected, fixed, and permanent light, 154 feet above high-water mark, and visible 14 miles all round. The land between Petten and Kykduyn is composed of small sand-hills, appearing at a distance like detached hummocks.

About a mile before Kykduyn is a point of land, upon which stands a small battery. From thence the coast turns directly eastward to the Helder. Between this battery and the town stands a large fortress.

The Texel Island lies to the northward of the Helder, its southern part being distant nearly $2\frac{1}{2}$ miles. It has a low appearance, and like the coast we have described, abounds with sand-hillocks. On it are four churches, three of which have steeples; the fourth is without one, and roofed with blue slates. The Texel Island is about 11 miles long, and its southern part 5 miles broad; but towards its northern extremity it becomes narrower. Between the Helder and this island, is the great and much frequented channel leading to the Zuyder Zee. Before its entrance lie the *extensive* and *dangerous sands*, called the *Haaks*, which divide it into several channels; of these the southern ones are the most frequented, being sufficiently deep for the entrance of the largest ships.

The southern entrance to the Texel bears from Orfordness east, distant 41 leagues; from Yarmouth E. by S., 36 leagues; from the Humber S.E. $\frac{1}{2}$ E., distant 54 leagues; from Flamborough Head S.E. $\frac{1}{4}$ S., nearly 60 leagues; and from the Hook of Holland N.E. $\frac{1}{2}$ N., 22 leagues.

LIFE BOATS.—*The North and South Holland Society* have established life-boat stations at the different villages, all along the coast between the Maas and Texel, and a great number of lives have been saved by their exertions, since they were first stationed on this part of the coast; and life-boats may be found at the following places, viz.:—Huesduinen, Calandsoog, Petten, Egmond, Wyk-aan-Zee, Zandvoost, Nordwyk, Katwyk, Scheveningen, and Heide. These boats have one mast, a foresail, and boom-mainsail, and carry a red flag, with a white ball in the centre. The name of the society is also painted in large letters on the mainsail.

SAILING DIRECTIONS FROM THE MAAS TO THE TEXEL.

IN sailing from the southward for the Texel, you may keep along shore, in 4, 5, 6, and 8 fathoms, or deeper water, regulated by your distance from the land. There is no danger in your way until you reach the Polder, which lies so near the shore that it may easily be avoided. A N.E. course will bring you to the entrance of the Helder; but vessels coming from seaward, or the English shore, should endeavour to fall in with the Camperdown Hills, which, as before observed, is the highest part of the whole coast; and strangers must be particularly careful not to mistake Kykduyn for Camperdown, lest they should fall in with the Haak Banks before they are aware of them, for these are steep-to and dangerous. Having, therefore, made sure of Camperdown, you may safely stand in towards the land, and run on in 7, 6, and 5 fathoms, only steering clear on the outside of the Polder, which is situated off Petten; and as you approach Kykduyn, you will see two small beacons which are erected on the sand-downs; these brought in one, serve as a leading-mark to the outer buoy; or, if by night, keep the light at Kykduyn about N.E., and it will run you in, mid-channel, between the buoy and the shore.

In approaching the Haaks from the westward, great care is requisite to avoid coming too near them; for they are steep-to, shifting suddenly from deep to shallow water; and many vessels have been wrecked for want of using proper precaution; it is, there-

fore, advisable not to get into less than 12 or 13 fathoms water; and when in that depth, to endeavour to round the sands either to the northward or southward.

The *Haaks* are very *dangerous sands*, composed of *many patches*, which are frequently shifting, and have several channels between them. The southern channels now in use are the Schulpe Gat, or Inner Channel, and Land Deep.

TEXEL PILOT-BOATS, cutter-rigged and built, are always to be found cruising in the English Channel, near the Isle of Wight. There are also coast-pilot boats, which will be found near the Schulpe Gat, unless the weather is very severe. The word "Texel," is in large letters on the mainsail, and they carry a blue flag, with a white number in it. These are round-sterned boats, and have a small mizen-mast and bowsprit.

There are STEAM-TUGS at Nieudiep, which will come off, by making the usual signal, viz., two flags, one 4 or 5 feet above the other. Your signal for a steamer, will be repeated by a ball from Kykduyn lighthouse; and when the ball is hauled down, the steamer will be coming off; but when a red flag is hoisted, it is a sign that the steamer cannot assist you. You may make the signal for a steamer, as soon as you think it can be seen from Kykduyn lighthouse.

DIRECTIONS FOR SAILING INTO THE TEXEL.

ALL vessels from the south-westward, bound to the Texel, should endeavour to make the land in the vicinity of Egmond-aan-Zee, which has the best land-marks for ascertaining your position of any on this part of Holland; and when you have ascertained your position, you should haul off into 14 fathoms; when near to Petten, you should not come into less than 10 fathoms, to avoid *De Polder Bank*, before mentioned. If it be too late in the day to enter either of the channels, you may stand off and on, during the night, in from 12 to 15 fathoms, with Kykduyn light bearing between E. by N. and N.E. by E. Observe, that the flood-tide sets to the N.E. when you are to the southward of the West Gat; and to avoid the Haaks, you ought to be able to stem it; but in the summer you may anchor outside the Schulpe, in 6 or 7 fathoms, with Kykduyn light bearing N.E. by E., and Calandsoog steeple S.E., nearly 3 miles from shore.

The SCHULPE, or SOUTH GAT, lies along the shore, its entrance, opposite the outer buoy, being not less than $1\frac{1}{4}$ mile wide, but becoming very narrow as it approaches the Helder, where it takes the name of the Drempel. The port side of this channel is pointed out by eight black buoys, all placed upon the inner edge of the *Bollen Shoal*, or *South Haaks*. The outer buoy lies in $4\frac{1}{2}$ fathoms, with Kleine Kaap beacon, just open north-westward of the lighthouse at Kykduyn, bearing N.E. $\frac{1}{2}$ E., distant 4 miles; and the two Sand Dyk beacons in one, bearing S.E. $\frac{1}{4}$ E. The second buoy bears from the first N.E. $\frac{1}{2}$ N., distant $\frac{3}{4}$ of a mile. The ramainder of the buoys are laid in a N.E. direction, about $\frac{3}{4}$ of a mile apart. There are also 6 buoys to be left on the starboard side when entering. These buoys will direct you through the Schulpe Gat. But supposing them to be removed from their stations, the mariner must take good care to go round to the southward of the Haaks, bringing the south point of the Sand Dyk, which is high, and very conspicuous, about E.S.E., or the Sand Dyk beacons in one; and when the Kleine Kaap, or Lower Beacon, appears at the foot of the Kykduin light, or about a handspike's length open to the northward of the light, you will then be near enough to the shore, and may sail, with this mark on, past the assigned place of the outer buoy; but if you come from the northward, you must take care to avoid the southern end of that part of the Haaks called the Middle Rug, which you will readily effect, by getting the houses of Goete, south of Nol, to the southward of Keeter Flakte; or by keeping Calandsoog steeple, just open to the southward of the sand-hill, bearing about S. by E. $\frac{1}{2}$ E., keeping this mark on until you are near enough to the shore to clear the South Haaks. The southern part of the Haaks is very flat, with from 19 to 27 feet over it. Having cleared the southern point of the Haaks, steer N.E. by N. to near the fourth black buoy; then a N.E. course will take you through, in mid-channel. The leading-mark for entering this channel from the south-westward is de Westen, between Den Heuvel and Jonge Pietersduyn, on Texel Island, bearing N.E. $\frac{1}{2}$ N. The outer black buoy has a beacon on it, and

when between the third and fourth black buoys, you may anchor in $4\frac{1}{2}$ fathoms water. When passing the light keep at 2 cables' length from shore, by which you will avoid the Zwemmer; then steer about E.N.E. towards the Drempel, keeping mid-channel, and clear of the two stony points, as well as of the sand, which you will do by bringing the Hoorntje open of the stones at the battery point. It is high water in the Schulpe, at 6h. 30m., and the tide sets nearly straight through the channel, but when near the inner part, the flood sets towards the white buoys.

The WEST GAT divides the Southern Haaks into two parts, and is somewhat circuitous. The eastern part of this bank is named the South Haak, and the outer or western part, the Middle Rug. The passage between is a mile to $\frac{1}{2}$ a mile wide, and was formerly much frequented by large ships; but the Schulpe Gat is now preferred. The West Gat is now buoyed off with black buoys, and the outer red buoy, to be left on your port side in entering, and white buoys on your starboard side: the white buoys lie on the edge of the Wittonsrug. A *long narrow ridge* runs nearly across the entrance, and forms a *bar*, of 15 to 16 feet, within this the water deepens to 6, 8, and 9 fathoms.

To proceed through this channel, should the buoys be gone, you will, as in approaching the Schulpe Gat, get the Sand Dyk to bear E.S.E., or the Sand Dyk beacons in one, bearing S.E. $\frac{1}{4}$ E., until you get the Hoorn Church, on the Texel, to bear E.N.E., or seen between Den Heuvel and Jonge Pietersduyn. This is the leading mark for the West Gat, the outer black buoy lying with Kykduyn lighthouse W. by N. $\frac{1}{2}$ N., distant $4\frac{1}{4}$ miles, and the outer white buoy with Kykduyn lighthouse W. $\frac{1}{2}$ N., $3\frac{3}{4}$ miles; these mark out the entrance; and between them is a bar of $2\frac{1}{2}$ and 3 fathoms, about $\frac{1}{4}$ of a mile broad. Crossing this, you will deepen your water to 6 and 10 fathoms in mid-channel. When entering, steer E.N.E. across the bar, with the beforementioned marks on, until past the second black-and-white buoys; then an east course will take you up in mid-channel, between the buoys, into the Texel Roads.

During the flood-tide you should keep over towards the white buoys, and during the ebb towards the black buoys, as the tides in the outer part of the West Gat set generally northerly and southerly, which requires some attention to keep in mid-channel.

DUINKER'S GAT.—There is a channel, which separates the North from the South Haaks, called Duinker's Gat, which is narrow, and used only by the native fishermen; yet there appears to be not less water in it than $3\frac{1}{2}$ fathoms, which is near the middle of the passage. It is very circuitous, and has neither buoy nor beacon to sail in by.

The NORTH, or NEW GAT, is a narrow channel, running along parallel to the Texel Island, bounded on the eastern side by the *sandy flat*, called the *Horse*, and to the westward by the Ezels and North Haak. This channel has a *bar* across it, near the middle, with only 9 feet on it; and it has so much grown up, that all the buoys have been taken away; even a small vessel should not attempt it without a pilot.

When coming from the northward towards the Texel at night, you must not lessen your water under 16 or 18 fathoms, as the *Eierland Reefs* extend out a great distance from the land to the N.E., as the stream of flood sets right towards them, and the soundings will be your only guide, should you be unable to see the light of Vlieland or Ter Schelling. In proceeding to the southward of the Texel, keep in not less than $12\frac{1}{2}$ or 13 fathoms, until Kykduyn bears to the northward of east, to avoid the Haaks; in rounding these shoals great caution is necessary, for sometimes S.W. gales will raise the water considerably in their vicinity, which ought to be taken into consideration.

NOTICE.—*The Hague, February 16th*, 1852.—The Minister of Marine having taken into consideration the numerous casualties which occur on the coast of the island of Texel, hereby informs and cautions mariners, that the coast of the island is, (for the purpose of avoiding the shallows extending from the said coast, known under the appellation of the "*Eierland Shallows*," and also designated by the fishermen as the "*Gardens*," or *Orchards*,") not to be approached within the distance of 2 to 3 German miles, or a depth of 16 to 18 fathoms.

The shallows to the north of the eastern part of the Texel are very dry, and extend about a mile from the shore; and the ebb-stream coming at this part of the coast from the N.E. and E.N.E. is apt greatly to mislead.

Ships coming west about, in thick weather and at night, are, therefore, especially

recommended to make timely and careful use of the lead, in order not to approach the coast of the Texel within the aforesaid 16 or 18 fathoms, the result shown by the lead being the safest guide to keep out at sea, in order to avoid the shoals and coast.

As the charts of the North Sea are in this respect less extensive, and as no special chart of the Eierland Shallows is in existence, it is intended shortly to cause accurate soundings to be made of the shoals, and which will then be inserted in the charts of that part.

The *Horse* is a *long sandy beach*, which lines the west and S.W. part of the Texel, and forms one side of the New Gat. At its S.E. end it bends inwards to a kind of shallow bay, of clay and mud, where boats and sloops may run in; on the north-eastern side of which is a good landing place.

About 2 miles from the Helder Point is the Nieudeep. The course from Helder Road up the Texel Stroom, is E. by N. $\frac{1}{4}$ N., and vessels frequently run to the anchorage at the eastward of Schans.

Two lights have been placed on the Weirhoofd, or Weirhead, which mark out the N.W. entrance to the Nieudeep—one nearly at the extremity of the Weirhead, showing a white light, placed 29 feet above the level of the sea; the other, in a south-westerly direction, 51 yards inside the former, and 35 feet above the level of the sea, showing a red light, first lighted April the 1st, 1843. They may be seen by vessels coming from the sea, as soon as they have passed the Westerhoop; and may be also clearly perceived from all points of the roadstead of the Texel, and the Texel stream up to the Texel Harbour, and to the Balg. As soon as the red light bears a little to the south of the white light, the entrance to the Nieudeep is open; and by steering S.W., the "Corps Morts" before the Nieudeep, and the Old-hoofd along the Weirhead, will be avoided; and steering along by the lights, the Nieudeep may be entered with safety.

Nieudeep Time Ball.—There is exhibited on board the guard-ship at the Nieudeep, a time-ball, from the maintop-gallant-yard, for the rating of chronometers. When the ball is not in use, it rests down on the topsail-yard. It is raised half-way up at 5, and close up at 2 minutes before 12 o'clock, and at the instant of noon, Nieudeep mean time, the ball will be dropped. The moment of noon is when the ball separates from the top-gallant yard; Nieudeep longitude 4° 46′ 41″ east of Greenwich.

GREAT DUTCH CANAL.—A grand canal is now formed from the Helder to Amsterdam, the object of which is to afford a passage for large vessels from the city of Amsterdam to the sea. The city has 40 feet water in the road, fronting its port; but the pampas or bar in the Zuyder Zee, 7 miles below, has only 7 feet; hence all ships of any considerable burthen, have to unload part of their cargoes with lighters, before they can enter the port. As the Zuyder Zee is full of *shallows* throughout, all ordinary means of improving the access to the port were necessarily ineffectual; and it was therefore determined upon cutting a canal from the town to the Helder. The distance between the two extreme points is 41 English miles, but the length of the canal is 50$\frac{1}{2}$ miles. The breadth of the surface of the water is 118 to 197 feet; the breadth, at bottom, 36 feet; and the depth 17 feet 8 inches. Like the Dutch canals in general, its level is that of the high tides of the sea, from which it receives its supply of water. It requires only two tide-locks, one at each of the extreme points; but there are two sluices besides, with a flood-gate in the intermediate space. It has eighteen draw-bridges. The locks and sluices are double, that is, two in the breadth of the canal. These are built of brick, with bands of limestone at intervals, projecting out about an inch beyond the brick, thus protecting it from abrasion by the sides of the vessels passing. A broad towing-path is on each side; and the canal is wide enough to admit one frigate passing another.

This canal takes its course from the River Ye; first running north to Purmerend, then west to Alkmaar Lake, then north again, by Alkmaar, to a point within 2 miles of the coast near Petten, and thence in a direction parallel to the coast, so far as the Helder, where it joins the fine harbour of Nieudeep. At this latter place is a powerful steam-engine, for supplying the canal with water during neap-tides, and for other purposes.

The time spent in tracking vessels from the Helder to Amsterdam, is commonly from 2 to 4 days, according to the strength of the wind. At present there are six stations for horses employed on the towing-path. But it is intended to use steam-tugs, propelled by a screw, for towing the vessels through.

Immediately opposite to the Helder, there are 100 feet water at high tides; and at the shallowest part of the bar, to the westward, are 27 feet. There are 40 feet water at the port; while above and below it, are not more than 12 or 10 feet. To vessels leaving Amsterdam, which formerly were detained by adverse winds in the Zuyder Zee, oftentimes for weeks, this canal must prove extremely advantageous.

With the wind strong from the west or W.N.W., the reis always a heavy and broken sea in the Texel Road; and as the ground is exceedingly bad to hold an anchor, it is advisable to come-to in deep water, before you get upon the bank, in 10 or 12 fathoms, as here the ground is better, and you have to drag up the bank; but if you come-to on the height of the ground, which is loose, you will drive off again into deep water, and be on shore upon the sand before it is possible to bring-up, even with four anchors ahead, the ground being nothing but soft mud.

Large ships cannot leave the Texel by the Schulpe Gat unless the wind blows from between the north and E. by S.; but as it will always be found requisite to obtain a pilot, a further description will be unnecessary.

It is high water, full and change, at the Schulpe Gat, at 6h. 30m.; at Nieudeep, 7h. 10m.; at Oude Shild, 8h.; in Texel Roads, 7h. 45m.; at the entrance of the North Gat, 6h. 45m.; and without the Haaks, at 6 o'clock.

TIDES.—All along the coast from the Maas to near the Texel the tides run regular, 6 hours each way; but it is only during the first three hours' flood, that any rise in the water is observed on shore, while the falling of the water lasts 9 hours. The tides in the Texel usually rise 4 feet.

Flood-tides generally run in the Schulpe Gat N.N.E., or incline more to N.E. In the Land Deep they run first N.E. along the South Haaks, as far as the Bree Wyd, and from the Bree Wyd to the Helder, east; through the Texel Stroom N.E.; through the Duinker's Gat, and as far as the eastern end of the Middle Rug, N.N.E., where it joins the Land Deep in Bree Wyd, and as before observed, takes an easterly direction. In the North Gat the flood comes up 3 hours later than in the Schulpe Gat. Following the channel between the banks, till having passed the Laan, it joins the general stream, and runs up eastward to the Hoorntje. This tide then turns N.N.E., and follows the course of the roads; while the flood at the Nieudeep turns to the south eastward, through the Weiringer Balg.

The ebb is commonly in the opposite direction to the flood, and runs with great force upon the Helder, although the flood still runs out of the North Gat, and is in direct opposition to it. The course of the currents, and the different directions they take, from the beginning to the end of the flood and ebb-tides, require the greatest attention, and cannot be attained without much practical knowledge. In general, the stream of tide follows the course of the banks, and is both strongest and longest where the water is deepest.

At the Drempel the water never stands still, the flood and ebb succeeding each other immediately, without intermission. These are all the general rules which can be given or the tides here, as the prevailing winds, and other local causes, continue to influence their influx and reflux, and cannot be ascertained without absolute practice.

In the offing, a little before half-flood, the stream sets directly into the Texel; and from about half-ebb to half-flood, it sets directly out; but the first of the flood, with the latter part of the ebb, sets nearly N.N.E. over the banks and out of the North Gat; and the latter part of the flood, with the first part of the ebb, sets nearly S.S.E. over the South Bank, till nearly half-ebb.

Along the coast of Holland, with the wind to the southward of west, there is no assistance from the ebb, in turning towards the Maas, or beating to windward; because, with such winds, there is no ebb running by the shore.

FROM THE TEXEL TO THE ELBE, WESER, ETC.

Description of the Land, &c.

THE land to the northward of the Texel continues low, and is fronted by numerous small islands, which, in clear weather, are visible 4 or 5 leagues off at sea. Between these and the main are various passages and channels, leading to the different towns situated upon the coast; and within this space are the large rivers of the Ems, Jahde, Weser, Elbe, and Eider; the last communicating, by the Canal of Rendsburg, with the Baltic, or East Sea. Numerous *sand-banks* also surround the shores, some of which are particularly dangerous, and will be described hereafter. The islands which lie between the Texel and Weser are Vlieland, Ter Schelling, Ameland, Schiermonnik Oog, Rottum, Borkum, Juist, Norderney, Baltrum, Langer Oog, Spiker Oog, and Wanger Oog. Many of these islands have been encroached upon by the sea, which threatens to annihilate them at no remote period, unless prevented by art and industry.

VLIELAND is a long narrow island, running to the north-eastward nearly 10 miles. A lighthouse is erected on the west point or Horst of Vlieland, and is furnished with 2 oval screens, the one bearing N.E. and S.W., and the other N.W. and S.E. This part of the coast is generally approached far too closely, and especially by small ships, and very great risk is incurred by sailing near the coast and shallows, and mariners are strongly recommended, when sailing round or along this part of the coast to keep well off, and not to omit the frequent use of the lead. On the eastern part is a village, several beacons, and a lighthouse, showing a bright fixed light, visible, in clear weather, $1\frac{1}{2}$ mile off, intended chiefly to direct vessels into the Vlie Stroom.

The VLIE is a broad channel, formed between Vlieland and Ter Schelling. It is encumbered with *several dangerous sand-banks* at its entrance, which divide it into four distinct channels, two being to the westward, and two towards the N.E.

TER SCHELLING is about 9 miles long, and $2\frac{1}{2}$ broad, running in an east and west direction. It is surrounded by a sand-bank, of shallow water. On its western end are two beacons, Brandaris tower, and two towers, and near them the village and church of West Schelling. There are three other villages on the island—Midsland, Hoorn, and Oosterend.

The Schelling coast light is a revolving lenticular lamp-light, of the second size. At the distance of 4 miles, 15 to a degree, this light is not visible during 14 or 15 seconds. The light is placed on a tower, called the Brandaris, on the west coast of the island, in latitude 53° 21′ 40″ north, and longitude 5° 13′ 7″ east of Greenwich. It is placed 177 feet above high water mark, is visible at a distance of 5 miles, 15 to a degree (20 miles), and illuminates the horizon entirely.

The Western Gat of the Vlie Stroom is called the Stortemelk, and is both narrow and intricate. At its entrance is a buoy, coloured red-and-black, bearing about N. by W., $2\frac{1}{2}$ miles from the lighthouse on Vlieland. There are several other buoys within the bar.

Notice, August, 1853.—That for better observation at Sea, large anchor-shaped beacon-buoys, painted red, with a crown or top basket, have been placed off the entrance to the following channels, viz:—Outside the N.E. Friesche Sea Gat, the N.E. Sea Gat of Terschelling, Thomas Smith Gat; and the Storte Melk Sea Gat of Vlieland.

HOLLEPOORT.—The principal entrance to the Vlie Stroom is the Hollepoort, which lies between a bank on the north side, called the Noorden or North Buitengrond, and on the south side, called the Wester Grond, on the N.W. side of which is a white buoy. The outer buoy of the Hollepoort is red, and lies with a beacon on the strand of Vlieland in one with a mill on the south side of the island, bearing S. $\frac{1}{4}$ W., the S.W. end of the Ter Schelling S.E. by E. $\frac{1}{4}$ E., and the southern beacon on the North Vaarder, in one with the south beacon tower on the S.W. point of Ter Schelling. On the North side of the channel is a black buoy, a mile within the outer buoy, and a white buoy on the south side, distant $1\frac{1}{2}$ mile from the black buoy. This is called the Ton van Engelsch Hoek, or English Hook buoy, and lies on the western side of the Vlie Stroom. At the entrance of this channel the depth is 5 fathoms, farther in 4 and $3\frac{1}{2}$, and n the Stroom increases to $8\frac{1}{2}$ fathoms.

NEW GAT.—The entrance to the New Gat lies nearly E. by N., 5 miles from the Hollepoort, and is a convenient passage for vessels from the northward. It is between the Noorden Buitengrond on the N.W. side, and the Noord Vaarder on the S.E., the course in being nearly W.S.W., $\frac{1}{2}$ W. The first, or outer buoy, is black, with a beacon, and lies with the two beacons on Ter Schelling in one, and the two beacons on the North Vaarder in one; and within are three other black buoys, to be left on the port side. Opposite the last of these, is the beforementioned English Hook buoy. The second buoy bears from the first S.W. by W., distant a mile; and the third from the second W. by S., at nearly the same distance; and the fourth from the third S. $\frac{1}{4}$ W., a mile. Above the English Hook buoy are two white buoys,

which are to be left on the starboard hand, marking the entrance to the Vlie Stroom. The depth at the bar is 3 fathoms, increasing to 4½ mid-channel opposite the second buoy, and to 5 at the third buoy, and farther on to 8 or 9 fathoms. Off the last white buoy, on the starboard side, are 10 and 12 fathoms in the middle of the stream, where the channel widens to ¾ of a mile, the course of the Vlie Stroom being S. by W., about 4 miles, with 7, 10, 11, 7 to 5 fathoms, so far as the road, which is 2 miles above the eastern point of Vlieland.

Besides the above passages into the Vlie, there is another to the eastward. This runs in very near the west part of Ter Schelling; but it is too narrow and intricate to be attempted by any but small vessels, and those well acquainted with the passage.

From the east end of Ter Schelling, a *dry bank* extends nearly 5 miles, called the *Bosch*, which appears to have formerly constituted part of that island, and now forms the western side of the Ameland Gat, which lies between it and the island of Ameland. This gat has three entrances; the N.W. Gat, the Akke Polle Gat, and the N.E. Gat. The island thence extends E.S.E. ½ E., about 11 miles, with much broken land; but upon it are several villages, the chief being Hollum, near its west end.

The N.W. Gat lies between the Bosch on the south side, and a long narrow sand on the north side. It is very narrow, with only 12 feet over the bar; but the depths within increase to 4 and 4½ fathoms. At a considerable distance without the bar is a red buoy, in 5 fathoms, lying with a beacon on the west end of Ameland, in a line with the church at Hollum. S.E. ¾ E., 2 miles within this, is the first black buoy, on the starboard side of the channel; and beyond this two other black buoys, on the same side, being at about a mile distant from each other; the channel then continues about E.S.E., for more than a mile, into the main stream, within Ameland. There are four white buoys on the port side of the channel.

The Akke Polle Gat lies to the northward, nearly parallel to the N.W. Gat. It is not buoyed, although it appears to have 3, 4, and 5 fathoms water within it. Hollum Church in a line with the western down or hummock of Ameland, bearing S.E. ½ S., is the mark for the entrance to this gat.

The N.E. Gat lies between the Born Reef on the west side, and the bank on the shore of Ameland. It is about a mile wide, and extends 4 miles to the W.S.W. The bar, which is 2 miles wide, has from 12 to 9 feet over it at low water, the leading-mark, through the best water, being two beacons, standing on the eastern end of the Bosch, brought in a line, bearing S.W. by W. ½ W. The channel, when past the beacons, continues to the southward of the island, with 10, 6, 9, 7, and 5 fathoms.*

At the east end of Ameland is a narrow passage, called the Pinke Gat, dry at low water, and only used by small coasting vessels.

VRIESCHE GAT has its entrance in latitude 53° 32′. Without the bar, in about 5 fathoms, is a fairway red buoy, lying with the village church, in Schiermonnik Oog, bearing S. ¾ E., distant nearly 4½ miles. Within this buoy, the channel is marked out by black buoys on the western or starboard side, and white buoys on the eastern, or port side. The first three black buoys lie nearly in a line, bearing S.W. by S., and the first three white buoys nearly in the same direction; the third black buoy lying about W. by S., a mile from the third white buoy. The bar is 1½ mile broad, having over it generally about 2 fathoms at low water. About 2 miles from the third white buoy, nearly in the direction of the first three buoys, is the fourth white buoy, where the channel is more than ½ a mile broad, and the depth 5 fathoms mid-channel, whence it turns more to the eastward, and has a fifth white buoy on the port side, about a mile from the fourth buoy, opposite to which is the fourth black buoy. The channel now continues in a S.E. direction, to the seventh black buoy, continuing thence S.W. by S., with two white buoys on the port side, into the passage, called the Slenk, leading up Groningen Diep.

SCHIERMONNIK OOG, or ISLAND, is low and narrow, and is now only about 3 miles long, the eastern part being covered by the sea.

ROTTUM.—E. ½ S., 12 miles from the west end of Schiermonnik Oog, lies the island of Rottum, on the western or starboard side of the entrance to the Western Ems. Between these is the *sandy flat* of Bosch, and several small channels running into the Wadt, &c.

The RIVER EMS.—There are three entrances to the River Ems—the Western Ems, the Eastern Ems, and the Homme Gat; these two latter being separated at the beginning by the Juister Reef.

The Western Ems has on its western side, the Island of Rottum, Huiebert, Plaat, and other adjacent sands; and on the eastern side, the Borkum Reef and Island, the Randzel, &c.

The remains of Rottum is a small island, now not a mile in length. On it are two beacons and a house. Borkum is 2¼ miles in length, lying E. ¼ S. and W. ¼ N., and about 2¼ miles

---

* By a notice, dated Amsterdam, September 5th, 1842, the Born Reef having extended, from time to time, farther and farther to the N.E., the entrance of Zee Gat, off Ameland, has become so narrow, that its navigation is considered dangerous, and the red buoy, marking the entrance, has been taken away. The grain mill at Ballum, on the island of Ameland, which used to serve as a sea-mark, has recently been broken down, and is no more to be depended upon.

broad, being nearly divided mid-way into two parts. It has two beacons and a lighthouse upon it, showing a fixed light 142 feet above the surface of the sea, and visible 18 miles off, in clear weather. From Borkum runs an *extensive reef*, full $6\frac{1}{2}$ miles to the north-westward; and this sand properly divides the entrances of the Western from the Eastern Ems. *Huiebert's Plaat* is a *shifting sand*, which must be left on the starboard side. Between Borkum Reef and the Huiebert Plaat is the Geldzak Plaat. Hoorborn Sand lies a little beyond Huiebert's Plaat, and extends towards the Uithuizer Wad. The *Randzel* is a *large bank*, to the south-eastward of Borkum, forming the north-eastern boundary of the Western Ems, as well as part of the western and southern limits of the Eastern Ems. The Eastern Ems is bounded on the west side by the Borkum Reef, Brower's Plaat, and Randzels; and on the east side, by the Juister, Memmert, Kopor, Homborg, and Schuite Sands. The Homme Gat, as before observed, is only divided from the Eastern Ems by the Juister Reef.

The WESTERN EMS.—The entrance to the Western Ems is between two banks, called the Geldzak Plaat on the north, and the Huiebert's Plaat on the south side. The first, or outer buoy, is black, and lies in latitude 53° $36\frac{1}{2}'$, $13\frac{1}{2}$ miles E. $\frac{1}{2}$ S. from the red buoy at the entrance of the Vriesche Gat, its marks being the two beacons on Rottum in one, bearing S. $\frac{1}{2}$ E., and the southern beacon on Borkum in a line with the lighthouse, S.E. by E. $\frac{1}{4}$ E. From this, a white buoy, on the S.E. end of the Geldzak Plaat, bears E.S.E., distant $1\frac{1}{4}$ mile. At $\frac{1}{2}$ a mile from the Geldzak buoy, a black buoy, called the Dremple, lies nearly south. Between these is the entrance; but keep rather to the north side, or white buoy, where you will have 3 fathoms at low water. After having passed these buoys about $1\frac{1}{2}$ mile on an E.S.E. course, you will be in the main stream, with about a depth of 8 fathoms, where the channel is buoyed, with black buoys on the western, and white buoys on the eastern side. Proceed in this channel S.S.E. and S.E. by S., 5 miles, when you will be S.W. of the black buoy of the Inner Huiebert, with the Borkum lighthouse bearing N.E. by N. Here the channel is about a mile wide, with 10 to 14 fathoms, mid-channel, on blue clay, with shells and stones.

S.E. by S., nearly 2 miles beyond the Inner Huiebert buoy, lies the N.W. end of a *middle ground*, called the *Meenwen Staart*, extending thence S.E. by S., $4\frac{1}{2}$ miles, having a white buoy near each end, and one on its S.W. side between them, all of which are to be left on the port side; five black buoys being on the starboard side of the channel. In this part of the passage you will have 10, 7, 8, 6, 8, and 10 fathoms water. You must be careful to avoid going to the eastward of the first white buoy of the Meenwen Staart, by not bringing the Borkum lighthouse to the northward of N. by E., as the tide of flood sets strongly over that sand; but if the lighthouse cannot be seen, you may borrow on the west side of the channel by the lead, but not going into less than 6 or 7 fathoms water.

The *Ems Horn* is another *middle*, lying 3 miles to the south-eastward of the east end of the Meenwen Staart. On its east side are three black buoys, to be left on the starboard side in going in. It is narrow, but about $3\frac{1}{2}$ miles long. On its western side is a passage, called the Docke, at the entrance of which is a black buoy; but as the flood tide sets strongly through, it is to be carefully avoided. The course from the buoy on the east end of the Meenwen Staart, to abreast of the first buoy on the east side of the Ems Horn, is S.E. by E., and distant nearly 5 miles; when a S. by E. and south courses will carry you to the third black buoy. Having passed this buoy, steer more westerly, between that and a white buoy on the north end of the Hond, leaving the latter on the port side; a south-westerly course will then lead you to the Road of Delfzyl. In this passage you must not approach the Ems Horn nearer than 5 fathoms, as it is steep-to, and should be carefully avoided; for, in this part of the river, the streams of the Eastern and Western Ems unite; so that, if a vessel were to ground here, she would probably be lost.

De Paap.—Beyond the Ems Horn is a large *middle ground*, called the *Paap*, which extends 5 miles in a S. by E. direction, and is steep-to. The western side bends circularly parallel to the western shore, having between, in mid-channel, from 9 to 6 fathoms at low water; but you should not advance on either side into less than 5 fathoms. When a windmill, seen over the town of Delfzyl, bears S. $\frac{3}{4}$ W., it will lead you clear of the western edge of the Paap, until you open the haven of Delfzyl, whence you may keep over towards the eastern shore, in 6, 7, to 5 fathoms. In the mid-channel there are 8, 9, and 10 fathoms, with soft sticky ground. Now steer E.S.E., leaving the white buoy, on the S.W. end of the Paap, on the port side; keep on this course, or rather more easterly, until you arrive near the point called the Hoek van de Knok, from which a breakwater projects out, with a swinging beacon, altogether about 3 cables from the shore. At $\frac{1}{3}$ a mile S. by E. from the Hoek there is a black buoy, pointing out the extremity of the Wiebelsummer Plaat, which is to be left on the starboard side; then by keeping near the shore, you may, with the tide, reach the road before Embden, where a vessel, not drawing more than 12 feet, may conveniently lie off the town.

The EASTERN EMS.—In making for the Eastern Ems, bring the great beacon upon Borkum, in one with the light tower; keep them thus, until in 8 or 7 fathoms, where you will find the first, or outer black buoy, in latitude 53° $40\frac{3}{4}'$, the light tower and beacon bearing S. $\frac{3}{4}$ E., distant 6 miles.

Embden, March 7th, 1843.—The Hydrographic Administration of this port, on the 5th instant, notified the following:—In order that mariners entering the River Ems may, at the outermost

buoy, have a certain mark, to ascertain whether they are before the mouth of the Western or Eastern Ems, it has been determined that, from the present date, there will be laid down, at the mouth of the Eastern Ems, a large black buoy, pointed at both ends, in the form of a ship's anchor-buoy. The situation of this buoy in every other respect, however, is to remain unaltered, at 8 fathoms, low water mark, the light tower on Borkum a little westerly of the Great Kaap of Borkum.

The channel of the Eastern Ems is regularly buoyed with black buoys on its western, and white on its eastern side. The first white buoy bears from the outer black buoy E. $\frac{3}{4}$ S., rather more than 2 miles distant. It lies in 5 fathoms, the ground between them being soft and sticky. The second black buoy, in $5\frac{1}{2}$ fathoms, lies S.E. by E., $1\frac{3}{4}$ mile from the outer buoy; and W.S.W., a mile from the first white buoy, the channel between having a depth of $6\frac{1}{2}$ fathoms. The third black buoy, called the Middel, bears from the second S.E. by E., $1\frac{1}{2}$ mile; and the fourth from the third S.E., $1\frac{3}{4}$ mile, nearly. The second white buoy lies on the eastern side, a little below the fourth black buoy, in $5\frac{1}{2}$ fathoms. The channel here is S.E., with the flood running in the same direction; and the depths are from 6 to 7 fathoms. From the second white buoy to the third, which lies on the S.E. end of the Juister Reef, the course is S.E. $\frac{1}{2}$ S., and the distance $2\frac{1}{4}$ miles. This latter buoy has lately been changed for a buoy pointed at both ends, like a ship's anchor-buoy, and striped black-and-white. Opposite to this striped black-and-white buoy, is the fifth black buoy, or Middel Brower, in 4 fathoms, bearing from it W. by N., a mile. Having passed these buoys, you will enter into the main stream of the Eastern Ems; and when you arrive at the sixth black buoy, or Binnen Brower, will have crossed the bar, with $3\frac{1}{2}$ fathoms, where the two beacons on the eastern extremity of Borkum will appear in a line. About a mile eastward of the Binnen Brower black buoy, a new white buoy has been laid down, on the edge of the Rachelot Plaat, to be left on your port side going in.

From the bar, the direction of the channel is S.E. $\frac{1}{4}$ E.; and its breadth, for 4 miles, more than a mile, with 8 to 11 fathoms; three black buoys mark the western side. It thence is contracted by a bank on that side, called the Koning's Plaat, to less than $\frac{1}{2}$ a mile, where the third black buoy, or Koning's Ton, appears in the middle of the river, 5 miles above the Binnen Brower buoy. About $\frac{3}{4}$ of a mile S.E. by E. $\frac{1}{2}$ E. from the third Koning's Ton, a white buoy has been placed on the Rosser, or Koper sand, to be left on your port side going in. Below the Koning's Ton, or King's buoy, is a roadstead, with a depth of 10 fathoms.

At 2 miles from the Koning's Ton is the Kaap Ton, which is red, the course up being S. by E. and south, with 10 to 6 fathoms. You now arrive at a narrow part of the channel, called the Wester Balg, the water there being shoaler. The Wester Balg has two black buoys on the western, and three white ones on the eastern side, the second black buoy being called the Randzel. This channel is less than $\frac{1}{2}$ a mile in breadth, with $6\frac{1}{2}$ to 3 fathoms in it. The mark through, as far as the Randzel buoy, is the spire-steeple of Holwierda, which is situate a little below Delfzyl, just touching a small wood, called the Wood of Watrum, on the west side, bearing S.S.W. $\frac{3}{4}$ W.; but this mark continued, will lead over the bar, at the termination of the Wester Balg, where there are only 6 or 7 feet at low water; you should, therefore, make for the fairway white buoy on the Balg, which you may pass on either side, in 12 or 14 feet; from whence you may proceed by the Ems Horn to Embden, as before directed. Allowance must always be made for the stream of tide, the flood setting strongly upon the Randzel Sand, below the Koning's Ton, and the ebb on Browers Plaat and the Juister Reef.

The HOMME GAT.—This passage into the Eastern Ems lies between the Juister Reef on the west side, and the Schaape Sand on the east side, and is nearly a mile in width. On the north side of this sand is a red buoy, lying at some distance eastward from the entrance, with two beacons on the eastern end of Borkum in a line, distant $6\frac{1}{2}$ miles.

Vessels bound into this Gat from the westward, should not approach nearer to the Juister Reef than 8 to 6 fathoms, until they bring the Borkum light-tower to bear S.W. by S.; being then on the west side of a round rugged down, called Kat Duyn, which is very conspicuous, and leaving the spit of the Schaape to the northward, should approach a white buoy on the west side of that sand, keeping it on the port side; here the depth will be about 4 fathoms. S.S.W. $\frac{1}{2}$ W., 2 miles from the white buoy, is a black beacon-buoy, in about $5\frac{1}{2}$ fathoms, on the eastern edge of the Juister Reef. Rather more than $1\frac{1}{2}$ mile S. $\frac{1}{2}$ W. from which is the Binnen, striped black-and-white buoy, already mentioned, on the S.E. end of the Juister. Having passed this you will enter into the main channel, and may proceed S.E. $\frac{1}{2}$ S., $4\frac{1}{4}$ miles to the Konings, or King's buoy. Leaving this on the starboard side, you may continue to Embden, as before directed.

The above instructions are to be used only in cases of necessity: for it will always be advisable to take a pilot for the Ems. The buoys are also frequently removed during the winter; and the tides commonly run in with great velocity.

There is a remarkable *flat of soundings* to the northward of Borkum Reef, which stretches out full 7 leagues, and has $1\frac{1}{2}$ and 2 fathoms less water over it than in the surrounding sea, the bottom being composed of coarse sand, yellowish red stones, and shells of a dark colour, between red and yellow. Vessels bound to Heligoland, will do well to gain the above spot, by which they may ascertain their distance, which, from Heligoland is about 19 leagues.

To the eastward of the Ems lie the islands Juist, Norderney, Baltrum, Langer Oog, Spiker

Oog, and Wanger Oog, all low sandy islands, fronting the main, having channels both between each other and the shore. These channels open a line of communication all the way from the Texel to the Ems, and from the Ems to the Jahde and Weser; but they are only navigable by small craft, and known exclusively by the natives.

WANGER OOG is distant from Borkum about 42 miles. It is a small narrow island, lying near the entrance of the rivers Jahde and Weser, having a sandy shore, so low, that the tide frequently overflows it. Upon it is a church and a lighthouse. This lighthouse stands, according to the latest survey, in latitude 53° 47′ 30″ north, and longitude 7° 51′ 55″ east from Greenwich. It is built of bricks, in form of a column, and supports a lantern, 67 Hamburg feet (about 63¼ English) above common high water mark, in which there is an intermitting lamp-light, alternately visible and invisible for the space of a minute, and is thus distinguished from the neighbouring lights of Borkum, Heligoland, Neuwerk, and Cuxhaven.

On board ship, supposing the eye to be 9 feet above the level of the sea, the light may be seen at the distance of 12 miles; and, consequently, becomes visible from the westward, when opposite the East Friesland Island of Langer Oog; from the northward, when midway between Heligoland and Wanger Oog; from the eastward, when near the light-vessel before the Weser, where the light of Neuwerk likewise begins to appear; and from the southward, when on any of the flats below Wanger Oog.

The lighthouse stands E. ¼ N., or north, 88° east, distant 1750 feet from the high tower with three pinnacles; is situated on the western part of the island of Wanger Oog, and discernible as a day-signal, at a considerable distance from sea.

HELIGOLAND is a small island, flat, but elevated, lying directly in front of the rivers Jahde, Weser, and Elbe. It may be seen, in clear weather, 6 or 7 leagues off, and has a good lighthouse upon it, 258 feet above the level of the sea, showing a fixed light visible 20 miles, and is lighted constantly throughout the year. This is the object vessels generally make when bound for the Elbe or Weser; and here pilots are to be found for both rivers. To the eastward of Heligoland is a small sandy island. Both these islands are surrounded with *dangerous reefs*, running chiefly to the northward.

South-eastward from Heligoland is the *Klip*, or *Steen Rock*, upon which a mast-buoy, painted black, with a small triangular top, and floating 8 feet above water, was placed in July, 1850. It lies in 4½ fathoms, 70 feet to the westward of the rock, with the two triangular-headed beacons on Sandy Island, in a line N.E by N., and the beacon on Heligoland in a line with the east side of the old tower, N. by W.; but as this buoy may, in stormy weather, be driven from its position, it will be advisable to attend to the marks for it, which are, the two beacons on Sandy Island in one, and the lighthouse in a line with a wooden-beacon on Heligoland. Heligoland lighthouse is in latitude 54° 10′ 50″ north, and longitude 7° 53′ 13″ east from Greenwich. It bears from Yarmouth east, distant 79 leagues; from the Spurn Head E.S.E ⅓ E., 92¾ leagues; from Flamborough Head E.S.E., 92 leagues; and from May Island, off the Frith of Forth, S.E., 126 leagues.

Vessels intending to anchor in the road of Heligoland, which certainly is not to be recommended, on account of the rocky nature of the ground, and the little security to be found there, should, if intending to enter by the northern passage, bring Heligoland to bear S.E., and proceed in that direction, until the island is about a mile distant; but be careful not to lose sight of the lighthouse lantern, over the cliff; and, in the night, keep the light in sight just above the cliff. When the north point of Heligoland bears S. by E., or the beacon in the lower town is open of the cliff, you may run in by keeping the centre of the highest beacon on Sandy Island in a line with that on the north side, from which it is distant 420 feet, and bears N.W. ½ N.; keeping these in a line S.E. ½ S., until the lighthouse and church are in one S.S.W. ½ W., brings you up to the mooring-buoys; or, at night, when the light bears S. by E. ½ E., you may bear up for the anchorage, always taking care that the light be not obscured by the cliff. Keep your lead constantly employed, and come not nearer to the downs than 4 fathoms. In mid-channel there are 6 and 7 fathoms. The best anchorage for large vessels is to the eastward of the downs. Over the bar, abreast of the town, are only 2 to 2½ fathoms at low water.

BEACONS AT HELIGOLAND.—Three new beacons, each coloured black, and surmounted by a triangle, have been erected on Sandy Island; and mariners are to observe, that the highest beacon, or centre one, in line with that on the west side, from which it is distant 340 feet, and bears S.W. ¼ S., strikes the Steen Rock. That the centre of the highest beacon, in line with that on the north side, from which it is distant 420 feet, and bears N.W. ½ N., leads into the north channel; and being kept so, until the lighthouse and church are in a line, and bearing S.S.W. ¼ W., will bring vessels up to the mooring-buoys.

The RIVER JAHDE runs in between Wanger Oog and the Mellum Sand. It is buoyed throughout, the sands which line the shore forming its western boundary, while the extensive shoals of the Hoher Weg are to the eastward, and divide it from the Weser. These sands have many swashways, or channels through them, which can be passed by boats. The outer buoy of the Jahde is striped black-and-white, marked on its upper side with a crown, and lettered "Jahde;" it lies in 4¾ fathoms, with Wanger Oog lighthouse S.W. ½ W., distant 3⅓ miles; Minsen Church, S. ½ W., 8¾ miles; and the outer black buoy on the Plate S.E. ½ S., 1⅓ mile; from this latter buoy Wanger Oog lighthouse bears W. by S. ½ S., 3½ miles. The entrance

lies between these two buoys, and runs in a south-easterly direction for $3\frac{1}{2}$ miles, leaving four black buoys on your starboard hand; then south to a fifth black buoy; afterwards a S. $\frac{3}{4}$ W. course will take you up the Jahde, leaving the white buoys on your port hand. The channel into the Jahde is only about $\frac{3}{8}$ of a mile wide, until you are above the fourth black buoy, or second white buoy, where it becomes $1\frac{1}{2}$ mile broad, but becomes narrower as you advance.

The following Official Notice is dated Oldenburg, June 4, 1844 :—

"The course of the Jahde is marked, at present, by 12 buoys, of which, seven lie behind the Wanger Oog and the Minsen Olde Oog, and five in the Upper Jahde, from Hooksiel, as far as the Abrahahn Felds, viz :—

"Of these buoys, the one marked "Jahde," will remain moored during the winter; the buoys 2 to 7 will be replaced in the beginning of November, by Bogin; the buoys 8 to 12 will then be removed altogether. All the buoys removed in November, will be replaced in the spring, as soon as the weather permits.

"In order to cover the expenses of these buoys, a tonnage of 8 groshen (gold) for each oat last of the burthen of a vessel entering the Jahde, will be levied. Such tonnage must be paid to the receiver appointed by the bailieship of Minsen, by all vessels of five oats last and upwards, whether they seek a place of refuge or freight, or to discharge their cargo, if they come to an anchor in the Jahde, south of the black buoy E. sub. No. 7, or if they visit a port or creek of the Jahde. Each vessel will, however, only once a year be liable to pay tonnage.

"All bailieships bordering on the Jahde, are hereby ordered, at the request of the lawful receivers of such tonnage, to assist in levying it in the same manner as other public taxes, and to decide, in cases of dispute, according to the foregoing resolutions. From the decision of such bailieship, an appeal can only be made to the Government."

Signed { MUTZENBECHER. BOCHOLTZ.

The RIVER WESER is formed by the Mellum and Hoher Weg to the westward, and the Tegler's Plaat, and numerous other sands, to the eastward, having its entrance divided into two channels by a *sand-bank*, called the *Noord Plaat;* of which, the south-westernmost is considered the fairway, and has been newly buoyed according to the following notice, dated Bremen, 3rd August, 1854 :—

The alteration in the relative position of the Buoys and Tuns, in the Fairway or channel of the Weser, having been carried into effect, it must be observed, that instead of the previous four red and two white buoy Tuns, six red and five white Tuns are now laid down in the new Channel or Fairway. The red Tuns, on coming in, lie on the starboard side, which are buoy Tuns in the usual form. The white Tuns, on the contrary, have the form of the usual Weser Tuns.

The first red Tun* at the new mouth of the Weser, is distinguished by a gilt key on a pole, and two white painted keys on its sides; it lies in 9 fathoms at low water, and the bearings from it are—

Wanger Oog Beacons in one S.W., Wanger Oog Church steeple S.W. $\frac{1}{8}$ S., and Minsen Church S. $\frac{1}{2}$ W. The second red Tun A lies in $8\frac{3}{4}$ fathoms, has a gilt spear on a pole, and two white painted A's on its sides. The third red Tun B, in 9 fathoms, has a round basket on a pole, and 2 white "B's" on its sides. The fourth red Tun C, in $7\frac{3}{4}$ fathoms, has a gilt cross on a pole, and 2 white "C's" on its sides. The fifth red Tun D, in 7 fathoms, has a round basket on a pole, and 2 white "D's" on its sides. The sixth red Tun E, in 7 fathoms, has a round basket on a pole, and 2 white "E's" on its sides.

The five white Tuns, each of which is distinguishable by two black numbers marked on its top, from No. 1 to No. 5 respectively. No. 1 lies at the extreme point of the Red Sand, in $6\frac{3}{4}$ fathoms water, with Wanger Oog steeple S.W. by W., and the red key Tun Buoy W. $\frac{5}{8}$ N. No. 2 lies in $5\frac{3}{4}$ fathoms, No. 3 has a vane stock, lies on the extreme point of the Mittel Plaat, in $5\frac{3}{4}$ fathoms. No. 4 lies in $4\frac{1}{2}$ fathoms at the upper end of the Mittel Plaat, and No. 5 lies not far from the Mellum Plaat in $6\frac{3}{4}$ fathoms.

The position of the light-vessel, No. 1, together with that of the black G Tun, is at present somewhat higher up, and the former lies in 9 fathoms' depth at low water, as also from the sixth red E Tun S.E. $\frac{1}{4}$ E.; from the white Tun No. 5, S.S.E. $\frac{3}{4}$ E.; from the black

---

* In the spring of 1855 this first Weser Key Tun will be painted black, but with respect to the remaining Tuns no alteration will take place.

Mellum Tun S. $\frac{3}{4}$ E.; from the white Tun No. 3, on Tegeler's Plaat, S.W. by W. $\frac{3}{4}$ W., and at the same time the bearing from the floating light or light vessel to the Bremen Beacon S. by E. $\frac{1}{4}$ E., and to the light-vessel No. 2 S.S.E.

The black Tun G lies in 7 fathoms at low water, with the steeple at Wanger Oog W.N.W. $\frac{3}{8}$ W., the Church at Minsen S.W. by W. $\frac{7}{8}$ W., and the light-vessel No 1 N. by E. $\frac{3}{8}$ E.

On the other hand the following five Tuns hitherto lying at the mouth of the old Fairway or Channel, have been taken up, viz.:—The black Tuns Key, A and B, and the white Tuns No. 1 and 2.

The white Tuns situated on Tegeler's Plaat, hitherto marked No. 3, and 3*a*, are at present numbered No. 2 and No. 3.

The positions of the remaining black and white Tuns below the light-vessel, and up to black C Tun, but which instead of the cross is at present distinguishable by carrying a black Vane stock (flugel stange) remains till further notice unaltered.

All vessels coming in and making the new mouth of the Weser, on an E.S.E. tack, will, after having found the first red Buoy Key Tun, in the above specified bearings, retain this course for a short distance till within the vicinity of the first white outer Tun, and having reached this they will have to direct their course S.E., and then get the light-vessel No. 1 straight before them. Steering in a direct line up to the light-vessel, they pass over the sand ridge of the former Mellum direct into the old Channel.

The depth of water in the new mouth is 9, 10, 11, and 8 fathoms, and on the sand ridge of the Mellum, which is moreover but very narrow, 27 Bremen feet at low water, or fully 4 fathoms English.

A second light-vessel is placed near the entrance of the Wurster Channel, marked "Weser, No. 2," and will remain there moored, annually, as long as the navigation is free from ice. This vessel lies S.S.E., 5 miles from the No. 1, signal-ship. Ships coming in from sea without a pilot, must pass near, and on the east side of the light-ship No. 1: then immediately bring the light-ship, No. 2, to bear S.S.E., steer directly for it, passing it on the east side; then steering S.E., keeping the light-ship N.W. for about a mile, come to an anchor at low water. Without a pilot they should not proceed farther. Both light-ships are painted red; their lights are fixed 28 and 29 feet above the water, and carry a red ball at their mast-heads.

Nearly mid-channel, at $1\frac{1}{2}$ mile above No. 2 light-vessel, lies a red buoy, carrying a flag, near the north end of the *Robben Plaat*, which divides the eastern from the southern channel leading to Fedderwarder, and must be left on your starboard hand when bound to Bremerhaven. Between this red buoy, and the light-vessel No. 2, is good anchorage, in 8 fathoms, off Bremer beacon. On the eastern side of the channel is the Kreuts white buoy, bearing from the Bremer beacon S.E. $\frac{3}{4}$ E., $3\frac{1}{4}$ miles; whence you may proceed to Fedderwarder or Blexum, by the chart passing the black buoys on the starboard, and the white ones on the port side, where you may obtain a pilot for Bremen.

Opposite to Blexum is Bremerlehe, where a new harbour has been constructed, at the mouth of the River Geest, under the appellation of Bremer Haven, and is now open for the admission of vessels bound to that place. A plan is in contemplation to cut a canal from Geestendorf, to be navigable for ships of the largest dimensions, through the Hanoverian territory, to join the River Elbe. The practicability of the undertaking has been considered and undertaken; by which a great advantage is anticipated to the commerce of Hamburgh.

Between the Dopp Kreutz buoy and the white buoy, No. 8, is the entrance of the Eastern Channel.* It lies between the Wurster Watt and Land Lutzen Sand. It first runs in abou E.S.E., and changes to S.E. and south. A red buoy, with a flag, is placed at the entrance, to show the fairway, which is regularly buoyed and beaconed, having the black buoys, &c., on th south and west, and the white buoys, &c., on the opposite side.

On the *Ever Sand*, near the southern edge of the Wurster, and on the port side of the channe leading to Bremerhaven, are three conspicuous wooden-beacons, placed in a triangular position At $2\frac{3}{4}$ miles S E. by S. from the Ever, stands the Jungfern beacon, surmounted by a ball and vane, also on the port side of the eastern channel.

The rights and privileges of a free port have been accorded to a district on the Weser, where a small stream (the Geeste) runs into that river. This port is very near Bremerhaven, the place where all vessels of heavy burthen bound for Bremen are obliged to bring up.

The Hanoverian Government are also deepening the water at, and in the approaches to Harberg; and, it is believed, with the intention of making Harberg a free port.

The RIVER ELBE lies to the eastward of the Weser; the outer or Key buoy of the Weser, bearing from red buoy of the Elbe W. $\frac{7}{8}$ S., 17 miles; and the red buoy of the Elbe bearing from Heligoland S.E. by S., distant nearly 20 miles. The channel towards Cuxhaven is bounded by the Schaarhorn Sands and Neuwerk Island to the southward, and by the Vogel Sands and

---

* BREMEN BUOYS TAKEN UP.—NOTICE.—*Bremen, April 15th*, 1849.—By order of the Government the following buoys have been taken up—"W.A.," "W.B.," "W.C.," "Double Eagle, Duppelt Alder," "Double Cross, Duppelt Kreutz," "W.L.," "W. 2;" but it is understood that all the outer buoys, Nos. 1 to 10, will remain, by which the departure of vessels, with river pilots on board, will not be prevented.

North Grounds to the northward, forming a passage in some places scarce $\frac{3}{4}$ of a mile wide. From Cuxhaven the river runs E.S.E. and S.S.E. toward Gluckstadt; about S. by E. to Stade; and then more easterly toward Hamburgh; the distance from the red buoy to Cuxhaven being 15 miles; from Cuxhaven to Gluckstadt 26 miles; from Gluckstadt to Stade 10 miles; and from Stade to Hamburgh 18 miles. The channel throughout is buoyed with black and white buoys: the black buoys are to be left, in going in, on your starboard side, and the white on your port side. On the Neuwerk Island are two lighthouses and two beacons; and on the Schaarhorn is another beacon. Besides these, are other buildings on the Neuwerk; but only the above beacons and lighthouses can be seen at sea.

The red, or outer buoy of the Elbe, lies with the Schaarhorn beacon and Neuwerk great light-tower in one, bearing about S.E. by S.

The first black, or Great Kettle buoy, is marked "A," and has Schaarhorn beacon bearing S. by E. $\frac{1}{2}$ E.

The second black, or Little Kettle buoy, is marked "B," and lies in 9 fathoms water, so that you may see the western house mid-way between the lighthouse and barn, Schaarhorn beacon bearing S. by W., and Neuwerk lights bearing S. by E. $\frac{3}{4}$ E.

The third black, or Schaar buoy, is marked "C," and lies in 8 fathoms, Neuwerk great light-tower bearing S. by E. $\frac{1}{4}$ E., the tower being in one with the northern beacon.

The fourth black buoy is marked "CC," lies a mile S.S.E. $\frac{1}{2}$ E. from the Schaar buoy, Neuwerk great light-tower bearing S. by E., and open to the eastward of the low tower and north beacon.

The fifth black buoy, marked "D," lies off the Hunde Ballje, the great light-tower bearing S. $\frac{1}{2}$ E., and the buoy, CC, N.N.W. $\frac{3}{4}$ W., distant a mile.

From the red buoy to the Great Kettle buoy, the distance is $1\frac{1}{4}$ mile, E.S.E. $\frac{1}{2}$ S.: from the Great Kettle buoy to the Little Kettle buoy, $1\frac{1}{4}$ mile E.S.E.; from the Little Kettle buoy to the Schaar buoy, a mile S.E. $\frac{1}{2}$ S. from the Schaar buoy to that marked CC, a mile S.E. by S.; from the buoy CC to that marked "E," or the sixth buoy, is $1\frac{1}{2}$ mile S.E. by S.; midway between lies the buoy D; and from E the great tower of Neuwerk bears S. $\frac{3}{4}$ W., distant 2 miles.

The seventh, or Flugel buoy, lies in $6\frac{1}{2}$ fathoms, S.E. $\frac{1}{4}$ S., $\frac{3}{4}$ of a mile from the Lee buoy, and is marked "F." It has a vane. The great tower in one with the eastern house, S.S.W. $\frac{1}{2}$ W.

The eighth black buoy is marked "G," and lies S.E. $\frac{1}{2}$ E., $\frac{3}{4}$ of a mile from the Flugel buoy. The ninth is marked "H," and lies $1\frac{1}{4}$ mile E.S.E. from that marked G, the tenth is marked "I," the eleventh "IK," and the twelfth "K," this lies S.E., $1\frac{1}{4}$ mile from IK; midway between is a black buoy an the edge of the Stiel Sand; and the thirteenth is "L," 2 miles S.E. by S. of K, and a mile N. by W. of Cuxhaven lighthouse.

These are all to be left on the starboard side in entering. On the port, or opposite side, are nine white buoys, lying on the edge of the Vogel Sand and the Lille Vogel, and distinguished as follow:—

No. I, the first, or outer buoy, in 7 fathoms. The Neuwerk light lies in a direct line with the great or north beacon, so that the light which bears S. by E. $\frac{2}{3}$ E is hid by the beacon.

No. II, lies nearly a mile S.E. $\frac{1}{4}$ E. from the buoy No. I. No. III lies $\frac{1}{2}$ a mile S.E. by S. from the buoy No. II. No. IV lies a mile S.S.E. $\frac{1}{4}$ E. from No. III; between them the inner light-vessel is moored. No. V lies near the N.W. extremity of the Lille Vogel, at the distance of a mile S.E. by S. from No. IV.

The buoys, Nos. VI. VI F, VII, and VIII, lie along by the S.W. edge of the Lille Vogel; No. VI F being directly opposite the Flugel buoy, and distant from it $\frac{3}{4}$ of a mile. From No. V to No. VII the course is S.E., distant $2\frac{1}{2}$ miles. The buoy No. VII lies with the great tower, and black buoy G in a line bearing S.W. by W., distant from the latter $\frac{1}{2}$ a mile.

No. VIII lies $1\frac{1}{4}$ mile from the buoy No. VII, No. VIII IX, lies E. by S. $\frac{3}{4}$ S. from No. VIII. The next, No. IX, lies $3\frac{1}{4}$ miles S.E. $\frac{1}{4}$ E. from No. VIII IX, and $1\frac{1}{2}$ mile N. by W. from the black buoy L. The buoy No. X lies $1\frac{1}{2}$ mile S.E. by E. from No. IX, a mile E. by N. from the black buoy L; and $2\frac{1}{4}$ miles N. $\frac{3}{4}$ E. from Cuxhaven lighthouse. The buoy No. XI lies $2\frac{1}{4}$ miles S. $\frac{1}{2}$ E. from No. X, and $\frac{3}{8}$ of a mile to the eastward of Cuxhaven light-house.

Two large sea-buoys, one black, the other white, denote the channel into the Ost River, which is about 11 miles above Cuxhaven, where it falls into the Elbe. In autumn, and thence until spring, the channel at the entrance of the Ost River will be marked out only by common buoys; and these you are cautioned not to approach too near.

LIGHTS IN THE ELBE.—The Outer Light-Vessel is moored in 11 fathoms, 2 miles N.W. by N. from the red or outer buoy; she shows a fixed light, visible 3 miles.

Loots Galliote, Pilot Vessel, shows 1 fixed light, and lies at anchor between the two floating lights, and carries a lantern half-mast high.

Inner Light-Vessel is near the west end of the Sand Reef, showing 2 fixed lights, red, and visible 3 miles.

Neuwerk Island Lights are both fixed, and are placed S. by E $\frac{1}{2}$ E., and N. by W. $\frac{1}{2}$ W., 685 yards apart, 120 and 60 feet respectively above high water, and visible 15 and 12 miles distant.

The low light is screened so as not to be seen by a vessel when it is between the bearings of S. by W., and S.W. by S., or when she is between the buoy No. V, and the buoy F. The intention of this arrangement is to apprise vessels coming up the river that they are entering the narrow and dangerous part of the channel, and that it would be prudent, therefore, to anchor. If, however, they persist in standing on, as soon as the light reappears, they should alter the course from S.E. by E. to E. by S., and even east, in order to allow for the indraught of the Eitzen Loch, which is strong from first to half-flood.

Kugelbaake or Boschaus Light is fixed, which, in a line with Cuxhaven light, will keep clear of the shoals to the eastward.

Cuxhaven Lighthouse is a circular brick tower, and shows a fixed light 80 feet above high water, and visible 12 miles distant.

A fixed light is established at Bosch on the north side of the Elbe, a mile westward of Margarettan, and 9 miles N.W. of Gluckstadt. There is also a fixed light shown at the south side of the entrance of the River Stoir, $2\frac{1}{2}$ miles N.W. of Gluckstadt; and on the end of the north harbour-pier, at Gluckstadt, is a light 24 feet above high water, visible in all parts of the Elbe at the distance of 8 miles; this light has a reddish appearance. Besides the above lights there are two light-vessels, moored near Schulau, to point out the best channel. These vessels show a red-and-white flag during the day.

The station of the light-vessel above is W. $\frac{1}{2}$ S. from the ferry-house at St. Schulau, and S.S.E. from the house at Ferhmannsand, the depth being $2\frac{1}{2}$ fathoms at low water.

The station of the light-ship below is E.N.E. $\frac{1}{2}$ E. from Meilstack; S.W. by S. from the house at Ferhmannsand; and the course to the black cask-buoy, is N.N.W. $\frac{1}{2}$ W. The depth where the light-ship is placed, is 10 feet at low water.

The direction of the light-ships, in respect of one another, is N.W. by W. and S.E. by E. They are nearly $\frac{1}{2}$ a German mile apart, to the north side of the channel.

For the sake of greater security, a buoy will be placed between the two light-ships, to the north side of the projecting curve of the Sand Reef.

A black cask will be stationed to the south of the New Channel, at the place opposite to the ships' wharf of Schulau, hitherto pointed out by a black buoy, where the ships coming from the Old Channel bear southward to the New Channel, which is buoyed.

Besides the colour (which sometimes may be mistaken), the white buoys are distinguished from the black by their figure and form; the latter being conical, with their points under water; but the white having the shape of a long nun-buoy, with two points; the one above water, with a vane, the other under water with an iron bar fastened to the chain, which keeps it erect, and makes it visible at a greater distance. The black buoys are lettered, commencing with A at the outermost, or westernmost, next to red buoy; and the white buoys are numbered, having their numbers in Roman capitals, No. I being the outer or westernmost buoy.

The continuation of the channel is pointed out by white buoys on the port side, and black ones on the starboard side, all the way to Gluckstadt.

NORTH ELBE.—The channel of the North Elbe having become navigable, it was buoyed off, during the summer of 1844, by two black buoys on the N.E. side of the Vogel Sand, and three white buoys on the Trindlegrund and Gehl Sand. When coming in from the westward, the black buoys are to be left on the starboard, and the white buoys on the port hand.

Ships coming from the north, intending to use the fairway, may, from the red buoy of the southern pijp (sluice), steer S. by E. $\frac{3}{4}$ E. for the white beacon-buoy marked A, keeping the last-mentioned on the port side; and from thence steer S.E. by E., till in the middle between the next white buoy before Trindlegrund, and the black buoy before the N.E. point of Vogel Sand, from whence the course is S. by E. $\frac{1}{2}$ E., at the following bearings:—The ball-beacon rather easterly of the fire-tower at Cuxhaven, in order to pass between the other buoys and the white buoys, Nos. IX and X, in the Elbe. Coming from the westward, the white buoy A must be passed; but the outermost light-ship in the Elbe, before reaching the buoy, must not be left more northerly than west. The ball-beacon is situated somewhat westerly of the light-tower of Cuxhaven; and the little light-ship in the Elbe 1° west of the Schaarhorn beacon.—*Shipping Gazette, October 12th*, 1844.

Northern Gat lies between the Great Vogel and Lille Vogel, or Riff Sand. Two buoys are laid down in this gat, painted black-and-white, in quarters. No. I lies $2\frac{1}{2}$ miles S.E. by E. $\frac{1}{2}$ E. from the inner light-ship. No. II has a beacon upon it, and lies E. by S. from No. I, distant $1\frac{3}{4}$ mile; after passing No. II, a S. by E. $\frac{1}{4}$ E. course will take you into the Elbe, between the buoys No. IX and X up to the black buoy K, taking care to keep the ball-beacon open rather easterly of the light-tower at Cuxhaven.

SAILING DIRECTIONS TO THE JAHDE, WESER, AND ELBE

SHIPS coming from the westward, and passing the Texel, at the distance of 4 or 5 leagues, will have from 14 to 18 fathoms, sandy ground; and steering E. ½ N., may proceed toward Heligoland, in 15, 16, or 17 fathoms, until they have passed *Borkum Flat*. This *reef* may be known by the soundings on it, which, as before observed, are coarse sand, with small red stones, and shells of a dark red, or yellowish colour. There will be found 1½ fathom less water upon it than on either side of this flat. These soundings extend about 9 or 10 leagues toward the north and N.N.E., at the mean distance of 19 leagues from Heligoland. They are very remarkable, there being no such on any part of the coast; hence, every one ought to obtain them, in order to ascertain their distance from Heligoland, when sailing for the Elbe.

In hazy weather, or with northerly winds, vessels may keep farther from shore than above mentioned; and if, in this case, it be supposed that the vessel is within 7 or 8 leagues of the island, when in 17 or 18 fathoms, with soft muddy ground, it is recommended not to steer for it, as the reckoning may be deceptive; and it is likewise to be observed, that 6 or 7 leagues to the northward of the island, there are soundings nearly similar to those off the shore to the southward, and also soft ground in the parallel of it. It is, therefore, particularly requisite, that navigators should be certain of having the soundings from the coast, or a good observation from the island; for the commanders of several vessels, neglecting this precaution, have supposed themselves to be off the coast, in 18 or 19 fathoms; and, having steered to the S.S.E., have gained 14 or 15 fathoms, with coarse sand and small stones; but with these soundings, found themselves several leagues to the northward of the island. A proper allowance should, therefore, always be made for the operation of the tide, which otherwise will drive you considerably to the eastward of your reckoning.

Vessels bound for either the Jahde, Weser, or the Elbe, commonly make for Heligoland, its lighthouse being a good and permanent mark, burning all the year round; and, if necessity requires, they may anchor between it and the small sandy island; for the riding on the east side of the downs is good, with from 7 to 10 fathoms.

To the southward of the island, and near the shore, lies a *rock*, called the *Steen*, or *Stone* (before mentioned), which dries at low water, in order to avoid which, in proceeding for the haven from the south-westward, care should be taken to keep the beacons on the Sandy Isle open of each other, until the lighthouse comes open to the eastward of the beacon of Heligoland. You may then proceed for the haven, and anchor in 3 or 4 fathoms water.

When coming from the eastward, the lighthouse should not be brought on with the beacon on Heligoland. So soon as the northernmost beacon on Sandy Isle comes open to the westward of the southernmost one, you will be within the Steen, and may proceed for the haven.

In sailing along the shore from the westward, for either the Jahde or Weser, an E. by S. course, making due allowance for the tide, will take you to the Schlussel, or outer buoy of the Weser,; from whence a S. ½ W. course for 1½ mile will carry you to the outer buoy of the Jahde, which lies on the west end of the Jahde Plaat, and is striped black-and-white, to be left on your port side,. This lies in 4¾ fathoms water. S.E., 1½ mile from the striped buoy, lies the outer black buoy, at the entrance of the Jahde. This buoy, and also four other black buoys, lying in a south-eastern direction, on the northern edge of the Plaat, must all be left on the starboard side going in. These buoys are about a mile apart. Between the fourth and fifth buoys there is a white buoy, on the eastern end of the Jahde Plaat, which must be left on your port side. From the fifth black buoy, your course up the Jahde is about S. by W., till abreast of Hooksiel; then S. ½ E. for about 3 miles; then S. by W. again, till you are above Heppens, where you can anchor, in 3½ or 4 fathoms; but as the sands up the Jahde often change their positions, it will always be necessary to obtain a pilot.

We have already noticed the lighthouse on Wanger Oog, which lies to the westward. There are no channels or harbours for ships between the Ems and Wanger Oog, the different channels between the islands being only fit for small craft.

The RIVER WESER.—Vessels from the Ems, and bound to the River Weser, should run along shore, in the depth of 12 or 11 fathoms, until they descry the light-tower on Wanger Oog, when they may stretch along from that island, in the depth of 14 or 15 fathoms, across the entrance of the Jahde, till they come to the entrance of the Weser; then haul to the southward, till they shoal their water to 10 fathoms, and Wanger Oog steeple bears S.W.: on which bearing, at the distance of 4½ miles, lies the first buoy, in 10 fathoms at low water, and has a gilt key on it, from which it is called the Schlussel, or Key buoy.

As it is customary to make Heligoland in running for the Weser, observe to keep a good look-out for the buoys. And great attention should be paid to your course in steering from Heligoland, either to the Weser or Elbe, as the tide is nearly on your broadside, both flood and ebb; and you may have occasion to steer 1½ or 2 points on either side of the direct course, to hit the buoys.

If bound from Heligoland to the Weser, with a northerly wind, steer to the southward, until Wanger Oog comes in sight; then bring the island to bear S.W. ¼ W., but not farther west, before you enter the river; and, with that bearing, you will run close to the white buoy, marked No. 1, on the north side of the new Weser Channel.

The black buoys are distinguished by letters, marked with white paint, and the white buoys numbered, in like manner, with black paint. Vessels may run up to either of them, so as to see their marks and numbers.

Should it so happen, when between Heligoland and Wanger Oog, that the weather becomes thick and hazy, so that land cannot be seen, steer no nearer to the coast than in 13 fathoms, clayey ground. Here, with a flood-tide and fair weather, you may anchor; but with the ebb, keep under sail; for the flood will drive to the southward, and the ebb to the contrary.

Having made the Schlussel, or Key buoy, you should steer as directed in page 125 to pass over the former Mellum direct into the old Channel, remembering to leave all the black buoys to the starboard, and the white buoys to the port.

From the light-vessel, No. 2, steer S.E., about a mile, and at that distance, come to an anchor between the light-vessel and the red buoy with a flag, which points out the separation of the Wurster and Fedderwarder Channels. Without a pilot you should not proceed farther. From hence the course of the Wurster Channel is S.E. by E., 4½ miles; till past the three Ever beacons, from thence the channel runs S. by E., nearly, for 12 miles to Bremerhaven; and to the Fedderwarder Channel, the course is S.S.E., about 5 miles, to the Sabzhorn Bank, or buoy, marked "P."

By bringing the light-vessel to bear S. by W., you may steer directly for her, and pass to the eastward of the Noord Plaat, through the North Weser; but this passage, from want of buoys, is not recommended.

Vessels at Heligoland commonly engage a pilot for the Weser; but, not having one, should steer from Heligoland S. by W., until they get sight of the church and lighthouse of Wanger Oog; bring the tower to bear S.W., and steer towards it; you will thus, in from 5 to 7 fathoms, get over the Noord Plaat, and come into the fairway of the Weser, where you see the white buoy, No. I; from which you may steer as before directed, and when you have advanced so far as the floating-light you will meet the pilot-boat.

In case you should proceed from Heligoland, south, you may gain sight of the signal-vessel sooner, or about the same time that you see the light-tower of Wanger Oog; and then, wind and weather being favourable, you may steer the same course for the signal-vessel at the entrance of the Weser. It is better to bring her a point to the westward of south. But this passage is to be recommended only to vessels not drawing more than 8, 9, or 10 feet; and there being no buoys, you must, the more constantly, when westward of the Noord Plaat, keep the lead going: for on the east end of the Noord Plaat are only 3 fathoms.

By far the greater number of ships bound up the Weser, and coming from the westward, steer directly along the islands Baltrum, Langer Oog, Spiker Oog, so far as Wanger Oog, in the depth of from 11 to 12 fathoms. When you have made the tower of Wanger Oog, approach towards the shore, until you have 10 and 9 fathoms; then bring the tower to bear S.W., and steer N.E. to the Key buoy, where you will have a depth of 10½ to 12 fathoms. If by night, the Wanger Oog light will be your best direction; you may then advance near enough to the white buoy, No., 1, to enable you to anchor on the S.W. side of the Noord Plaat, sheltered against a north or N.E. wind, until the break of day, when you may proceed on your way into the Weser.

In winter, with frost and ice, you must not enter the Weser, unless there is almost a certainty of reaching one of the harbours (Fedderwarder or Leher Hafer), where you may bring up in safety. In this case you must well observe, that if there are any drifts of ice already formed, it may be possible, with westerly winds, to reach Fedderwarder, but not Leher or Geestehaven; while, on the contrary, with N.E. or easterly winds, you have more chance of getting to Geestehaven than to the harbour of Fedderwarder. But, if time and circumstances do not allow you to sail into the Weser, you must take refuge at Cuxhaven or Heligoland, as deemed most expedient.

The RIVER ELBE.—Vessels sailing from Heligoland for the River Elbe, the entrance to which lies between the Vogel Sand and the Schaarhorn Reef, will steer S.E. by S. for the red buoy; but with a flood and southerly winds, the course is S.S.E., and with an ebb and north-easterly winds, S.E. In running in the fairway for the red buoy, you will have 20, 17, 15, 14, 13, and 12 fathoms, soft clayey ground, of a bluish colour, and at the red buoy, which lies in 10 fathoms, you will generally find fine yellow sand; but if in your course from Heligoland to the Elbe, you happen to find a hard sandy bottom, of a reddish colour, you may be sure you are to the northward, and out of the fairway.

Great part of the vessels coming from the westward, and acquainted with the Weser and Elbe, do not sail to Heligoland, particularly with southerly winds. In this case, having arrived between Wanger Oog and Heligoland, and having the one or the other of these islands in sight, they steer, with an easterly course, directly for the Elbe.

The Islands Wanger Oog and Heligoland bear N.N.E. and S.S.W. from each other, distant nearly 8 leagues. When midway between these islands, the direct course for the red buoy is E.S.E., distant 5 leagues; but allowance must be made for the wind and tide, the course, with flood, being S.E. by E., and with ebb E. by S., somewhat more southerly or easterly, according to the wind. In so steering, you will have 17, 15, 14, 13, and 12 fathoms, with soft bluish ground, as before observed. When standing towards the south shore, and coming into 10 fathoms or less, the bottom is hard fine white sand. But the sandy shore between the Rivers Jahde, Weser, and Elbe, *is very dangerous*, because it is steep-to, from 10 to 9, and 7 fathoms, and then dry.

If it should be dark or thick weather, you must be careful not to approach nearer than 13 fathoms, and then, if it be flood-tide, anchor. With an ebb you may, perhaps, keep under weigh until day-light, or until the weather becomes clear. Great attention to the winds and tides is necessary, observing that the flood sets northward and eastward, and the ebb westward and southward; and when near the entrance of the Jahde and Weser, in 12 fathoms, the flood sets into these rivers; but the ebb sets always to seaward. These currents are also stronger the nearer you are to these rivers, or to the passages between the sands.

It being a rule, that vessels should run into the Elbe and Weser with the tide, and always in the day-time, you will observe to regulate your approach to these rivers accordingly. The best guide for the entrance is the signal-vessel, which is stationed at the mouth of the river, a mile N.W. by N. from the red buoy, in 11 fathoms at low water, and 13 at high, having the great tower of Neuwerk, the Schaarhorn beacon, and red buoy in a line; and there moored with iron chains, and is not to leave her station in any stormy weather whatsoever, except when forced by the ice, in the winter-season. This vessel most commonly leaves her station only in the months of January and February, but may be forced by the ice to leave sooner, and return later; as on the contrary, she may sometimes, though seldom, happen to keep that station uninterrupted all the winter season. By being at the outer part of the entrance, and nearly 3 leagues to seaward from Neuwerk, she will easily be discovered by the approaching vessels, and distinguished by having three masts, with a red flag on the loftiest, which is the main-mast. By night she will exhibit a lantern-light 36 feet above deck; and in a fog, or hazy weather, when commonly no wind blows, she will, in every quarter of an hour, ring a bell during a minute; or, if vessels coming in and being already in sight, should, by rain or snow, disappear again, the signal-vessel will fire guns from time to time.

Besides the above signal-vessel, the Admiralty pilot-galliot usually lies at anchor near the outer, or red buoy, when stormy weather or ice does not prevent it; out of which, all vessels that come from sea must take pilots. This galliot is chiefly known by a broad vane at the mast-head; and in the night it carries a small lantern at her stern. When the weather will not permit the pilot-galliot to keep her station off the red buoy, she used formerly to lie off the Flugel buoy; but as the channel there has

shifted, a new station has been appointed for her when necessary, and she will no longer proceed to the Flugel buoy, but will anchor within the triangle formed by the buoys D, E, and No. 6.

The second signal-ship is stationed to the northward of the white buoy, No. 4, near the third black buoy. This vessel is distinguished from the outer, or first signal-ship, by having two masts. In the day, a blue-and-white flag, horizontally divided, hoisted at her mast-head; and during the night, showing two fixed lights, one above the other, 18 feet apart; and in foggy weather a bell will be rung.

The course from the first to the second signal-ship is S.E. by E., distant $4\frac{3}{4}$ miles. Steer first E.S.E., 2 miles, then S.E. $\frac{1}{4}$ S., for the second vessel, which bears from the Schaarhorn beacon N.E., and from the great Neuwerk tower N. $\frac{3}{4}$ W. She is moored in 11 fathoms water; and will keep her station from the 1st of October to the 31st of March, unless forced away by the ice. So soon as the arriving ships get near to the first, or outer signal-ship, they are to bring them in a line, and then steer as before directed, passing to the southward of the second vessel. By doing so, they will avoid the dangers of the Vogel Sand, Little Vogel, and Schaarhorn.

Having arrived at the second signal-ship, they must pass to the southward of it and steer S.S.E. $\frac{1}{4}$ E., to avoid falling upon, or behind, the Lille Vogel, or Sand Riff. After sailing about 3 miles you will be near the Flugel buoy, the Neuwerk lights bearing S.S.W., where you will find a tolerably good roadstead; anchor there until day-light, when the buoys and marks will be distinctly seen, and a pilot-boat will meet you. Masters of vessels entering the Elbe when there may be ice in that river, should be aware that the signal-ships may be compelled to quit their stations, and run out to sea; in such cases there will be great danger, and the utmost caution required, to enter it; but if they should be under the necessity of doing so, they must pay particular attention to the directions given in this work.

The two buoys in the northern Gat, between the Vogel Sand and the Lille Vogel, or Sand Riff, are black-and-white, quartered. After passing the buoy No. 2, a S. by E. $\frac{1}{2}$ E. course will take you into the Elbe, between the buoys Nos. IX. and X., to near the black buoy K, when you will be in the fairway for Cuxhaven.

The following notice of alterations has been issued by the Honourable Deputation of the Ports of Hamburgh and the Elbe.—We recommend the study of the chart of the mouths of the Elbe and Weser, and making yourself well acquainted with the sights and positions of the sea-marks, the depths of the channel, the situations of the sands, balljees, and hollows, particularly that behind the Lille Vogel, or Sand Riff, upon which several ships have recently been damaged. To avoid this middle ground, you ought constantly to keep your lead going, and to remain in the fairway, which lies more to the southward; also the Hunde Ballje and Kinder Ballje, which, by the flood setting inward, are apt to attract the ships, particularly when approaching it during a calm. It is the calms also which cause that thick and foggy air which obscures all sight of the buoys and marks: but, in general, with fair weather, the entrance to the Elbe is now made comparatively easy, by the liberal establishment of numerous sea-marks, lights, buoys, and pilot-vessels; yet, under the most favourable circumstances, there will always be some difficulties, which, however, an active and intelligent seaman will be able to overcome by proper care and attention.

To furnish the mariner with exact ideas of the above sea-marks, towers, lighthouses, and beacons, and also to prevent his mistaking one for another, they are exhibited upon the chart,* according to their form and measure, each at the side of the other; and those from Neuwerk are numbered, for their more accurate description, in the views or prospects of Neuwerk, where they are distinguished also by the same numbers as correspond with the plan. The situations and places from which Neuwerk is supposed to be seen, are also marked upon the chart, in Roman numbers, and are as follow:—

From No. I, the signal-vessel and red buoy, where Schaarhorn beacon and the great tower, or lighthouse, are on with each other.

From No. II, the gat, called Westertill, about 3 or $3\frac{1}{2}$ leagues' distance from Neuwerk, where the great tower bears E. by S., Schaarhorn beacon $1\frac{1}{2}$ point to the northward of the tower.

From No. III, the gat north-easterly from the entrance of the Elbe towards the

* Chart of the Elbe and Weser, published by the proprietor of this work.

north of Vogel Sand, about 3 or $3\frac{1}{2}$ leagues' distance from Neuwerk; the great tower bearing south, and Schaarhorn beacon $1\frac{1}{2}$ point to the westward.

The great tower of Neuwerk, and the Castle of Ritzbuttel bear N.W. and S.E. from each other, the variation at this time being 20° west. Before Cuxhaven you will everywhere find good anchorage; but if obliged by the ice, to run into the harbour, the best anchorage will be the Alte Liebe; and in case this harbour be already filled with shipping, you may go beyond the Schutshöft, upwards; and afterwards easterly, behind the said Höft, where you will obtain ample security against the ice.

The following Directions were posted at Lloyd's, 18th April, 1844.

"*Sailing Directions for the River Elbe.*—First.—Coming from sea with a northerly or N.W. wind, it is desirable to make Heligoland before running in for the river. There is a light-vessel and a red buoy at the mouth of the Elbe, the former 18, the latter 19 miles S.E. by S. from Heligoland. The light-vessel has three masts, and is painted red, with "Elbe," in white letters on her side. She carries a red flag at the main, by day; and from sunset to sunrise, a single fixed light, about 30 feet above the level of the sea, and lies in 11 fathoms at low water; Neuwerk high tower, Schaarhorn beacon, and red buoy in a line, bearing S.E. by S., the latter a mile distant. Coming from Heligoland with the first of the flood, the course is S.S.E. to the light-vessel; with half-flood S.E. by S.; and with the first of the ebb S.E. You will then shoal the water gradually from 20 to 10 or 9 fathoms, with blue mud, very sticky. The tail of the Vogel stretches across the river in this direction; and you have more water after crossing it, and on getting nearer to the station of the light-ship. When that bears S.E. by S., 6 miles, you will have 9 to 10 fathoms, very dark sand and mud; when bearing S.E., or S.E. by E., at the same distance, the bottom is blue mud, and occasionally muscle shells.

"The pilot-galliot, when weather permits, lies E.S.E., 2 miles from the light-ship, and E. by N., a mile from the red buoy, in 10 fathoms water. She is distinguished by a large red vane; and as long as there are any pilots on board, has the Hamburgh Admiralty flag flying by day, and a light by night. Ships entering the Elbe, are required to hoist the usual signal for a pilot at the fore by day, and to show a light at night, when approaching the pilot galliot, and to heave-to in sufficient time to enable a boat to come alongside, as near the galliot as practicable.

"Second.—In bad weather, when it is not practicable to board vessels at her proper station, the pilot-galliot removes to her inner station, near to Neuwerk. In such cases, ships will do well to attend to the following directions:—Pass to the northward of the outward light-vessel; then steer E.S.E., until the inner light-vessel bears S.E., or S.E. $\frac{1}{2}$ S., then run direct for her, leaving her on the port side; then steer S.S.E., or S.E. by S., till you can get close to the black buoy E., when, if you do not find the pilot-galliot, you may anchor in 6 fathoms. The buoys will be found to be a very good guide. In going in leave the black on the starboard, and the white on the port side. The white, on the north side of the channel, are nun-buoys; the black, on the south side, are can-buoys.

"Third.—Coming in at night, when Neuwerk high light comes above the horizon from the deck, you will then be about 8 miles from the red buoy; bring it to bear S.E. by S., and steer for it. When the low light at Neuwerk is seen, you will not be far from the outer light-vessel; pass to the northward of her, and steer E.S.E., till the inner light-vessel bears S.E. $\frac{1}{2}$ S. This vessel has two masts, shows two fixed lights, one above the other, 18 feet apart, is painted red, with "Elbe," in white letters on her side, and carries, during the day, a horizontally-divided blue-and-white flag at the main. When you have brought her to bear S.E. $\frac{1}{2}$ S., steer directly for her. Leave her on your port side, and bring her to bear (directly after passing her) N.N.W. Then steer S.S.E., care being taken to keep the light-ship N.N.W.; and keeping a

good lead going, you will shoal regularly from 13 to 6 and 5½ fathoms, when you will be close to the black buoy E, Neuwerk light bearing S. by W.; take notice, however, before getting so far as this, you may probably get one cast of 6 fathoms on the tail of the Lille Vogel, or Sand Riff, which stretches into the channel. It is very narrow, and you deepen to 7, 8, and 9 fathoms again. When you make sure of having got soundings on the south side of the channel, near the black buoy E, in 5½ fathoms, steer off to the N.E., in 6 or 7 fathoms, and anchor immediately. The channel is narrow here; and this is the inner station of the pilot-galliot, which carries a light by night, and will supply vessels with pilots that show a light, even at night, wind and weather permitting.

"Fourth.—It is advisable with the wind to the southward of west, as soon as you have sounded on Borkum Reef, to steer easterly, along the south shore, in 13, 14, to 15 fathoms, till you reach midway between Heligoland and Wanger Oog; you are then W.N.W., 16 miles from the red buoy. Then steer E.S.E., and keep the lead going. On this course you will find 17, 16, 15, 14, 13, and 12 fathoms, with a bluish sticky ground. If too southerly, you will have 9 to 10 fathoms, sandy ground, and must then steer more northerly, till you regain the before-mentioned depth. As soon as you get sight of the high tower of Neuwerk, off the Schaarhorn beacon, or the outer light-vessel, bring the object S.E. by S., and steer this course, the lead constantly going, till you are certain you have reached the mouth of the Elbe; and then proceed as stated in first and second.

"Fifth.—In coming towards the Elbe from the northward, keep the low light of Neuwerk open to the eastward of the high light, bearing S. by E. ½ E., or S.S.E. You will then cross the tail of Vogel Sand, in 6 or 7 fathoms; and when you deepen to 10 or 12 fathoms, you will be then in the Elbe, and may proceed as before directed."

GENERAL REMARKS.

When it is expected there is ice in the Elbe, whether these light-vessels are on their stations or not, it is not prudent for any ship to run into the river, unless there is a fresh wind at S.W., or west; as with these winds, and the tide at half-ebb, the channel is left free of ice; and ships may fully expect to get pilots and assistance, and to reach Cuxhaven harbour.

Vessels should not come nearer the Schaarhorn beacon than 9 fathoms; it is very steep.

Do not trust to your soundings on the Vogel Sand, between the white buoy No. II, and the station of the inner light-ship. The depth is very irregular; and being steep-to, from 13 to 14 fathoms, you are close to the dry sand. You may approach the Sand Reef to 5 fathoms on the south shore.

In order to guard against mistaking the high light of Neuwerk for the light-vessel, it is recommended, as the only sure guide to strangers, when they see a light, to bring it to bear S.E. by S., before standing for it, and in that bearing to steer direct for it. They will then even if the light-vessel is away, come to no danger before seeing the low light on Neuwerk, and by that know what light it is.

With reference to the sailing directions in No. 4, it must be remarked, the south shore is very steep, and should therefore only be adopted when the wind is to the southward of west, taking care not to get to the northward of the Elbe, by striking, in hazy weather, the shoal water of the tail of the Vogel, which stretches right across the Elbe, before sight of anything is got. Compass courses and bearings, and the distance 60 miles to a degree.

To sail into the Elbe at Night.

Although it is generally admitted that vessels ought to sail in only in the day-time, and at night should not even approach the entrance nearer than 2 or 3 leagues, outside of the red buoy, in 13 or 14 fathoms, yet different circumstances may admit of exceptions to this rule. For instance, if a ship wants anchors and cables, or if forced by hard stormy weather to run in, or having a dangerous leak, &c.; or, suppose it to happen, after a warm summer day, when by rising of vapour, the air becomes hazy near the horizon, and prevents a distinct sight of the sea-marks, then the commonly following fresh and clear night gives a good sight of the lights of Neuwerk, by which a ship may sail in with more safety, perhaps, than at high noon-day, when the horizon is so obscured with haze.

The high light of Neuwerk is elevated 120 feet above the surface of the sea, the lower one 60 feet. The high light may be seen at the distance of 5 leagues, by an eye 16 feet above the sea; therefore Heligoland light and that may both be seen about the same time.

Ships having the misfortune to run aground on the Vogel Sand, in stormy weather, with west and N.W. winds, are generally lost, with both lives and cargo; whereas, under the like unhappy circumstances, at Schaarhorn Sand, the men, retiring to the beacon are usually saved, and also some part of the cargo preserved. In all cases there is good anchoring ground everywhere to seaward before the Elbe; and many a vessel, but scantily provided with anchors and cables, has been saved in a heavy N.W. gale, by cutting away the masts, and riding out the storm, when others sailing in, at the same time were unfortunately lost.

The best time for going into the Elbe, wind and weather favourable, is about 1½ or 2 hours after low water, when the tide begins to set right in; but in bad and stormy weather with westerly winds, it may be preferable to run in an hour before high water, since, by the extraordinary rise of the tide, caused by the strong sea winds, the vessel may pass over many sands and shoals without touching, which would be nearly dry at low water: besides, if unluckily running aground, she will not be exposed for a long time to the violent shocks upon the ground by the high seas and breakers. As to the clearness of the sight of the seamarks on Neuwerk, the most suitable time for entering the Elbe in the summer season, is either early in the morning or in the afternoon, to avoid the beamy light which reflects from the air and water, and dazzles the eyes.

Gluckstadt Light is exhibited every night. From the Elbe this light will be visible, in every direction, at the distance of 8 miles from the harbour; and from S.W. by W. to the northern shore of the Elbe, it will have a reddish appearance.*

Times of High Water, *at the Full and Change of the Moon.*

At Heligoland, at 11h.; at Borkum, at 30 minutes after 10h.; at Wanger Oog, Key buoy of the Weser, and red buoy of the Elbe, at 12h.; at Cuxhaven, at 1h.; at Blexen, at 30 minutes past 1h.

---

* In the harbour lies a steam-boat for towing vessels to and from Gluckstadt. Ships desirous of the assistance of this steamer, are to hoist their national flag, at the mainmast-head; as soon as this signal can be seen from the harbour, information will be sent, by telegraph, from Cuxhaven to Altona; where arrangements have been made for transmitting it to this place in 2 hours, by railway trains, at 8 o'clock in the morning and ½ past 3 in the afternoon. The railroad from Altona and Kiel to Gluckstadt is connected, from Bahnhofe, by a horse-road, with places for landing and loading in the harbour; and the railway carriages can load and unload at the sides of the ships.

TIDES.—The stream of flood from the Texel towards the Elbe and Weser, sets easterly; off Borkum Reef east, a little north; at Wanger Oog E. by S.; at Heligoland E.S.E.; at the entrance of the Elbe S.E. by S.; at Cuxhaven S.S.E.; and at the Key buoy of the Weser S.E. by S. The flood runs 6 hours, and the ebb 6 hours and 25 minutes. The current is never quite at a stand; it only changes its direction and force. The ebb, at the red buoy, sets at first S.W., then west and N.W., and at last northerly; and, in like manner, the flood runs gradually north-easterly, east, and then S.E., directly into the channel.

At Cuxhaven the ebb begins an hour later than at the red buoy, continues 6 hours and 45 minutes, and is then followed by the flood during 5 hours and 40 minutes. In the road, the current does not cease entirely; the flood continues running $\frac{3}{4}$ or $\frac{4}{5}$ths of an hour after the water's falling on the south shore. Between Cuxhaven and the mouth of the river, the velocity of the current is greater then outward at sea. In the channel, mid-tide ebb, when strongest, runs about 3 to 4 miles an hour, and with flood 2 to 3 miles an hour, according to the moon's age. On full and change days, the perpendicular rise of the tide is 11 feet, and on quarter-days, $8\frac{1}{2}$ feet.

HELIGOLAND TO THE SOUTH PIJP, RIVERS EIDER, HEVER, WARDA, AND THE SCAW.

The NORTH and SOUTH PIJP.—The entrance to these channels lies nearly midway between the North Elbe and Eider Stroom, and is pointed out by a red buoy (it was formerly yellow), which lies near the northern edge of the sand that divides the North Elbe from it. This buoy bears from the outer light-ship at the Elbe N.E. $\frac{3}{4}$ E., distant 7 miles; from the outer white buoy of the Eider Stroom S.W. $\frac{3}{4}$ W., $5\frac{1}{2}$ miles; and from Heligoland light S.E. by E., 20 miles; these channels lead to Husum, Warveroth, Whorden, &c. The south Pijp has black buoys on the south or starboard side, and white buoys on the port. The north Pijp is not buoyed, but the sands are nearly dry on each side.

The river Eider lies to the north-eastward of the Elbe, and, like that river, is buoyed on both sides of the channel; but the sands so frequently shift their positions, that it will not be prudent to enter without a pilot. The outer black buoy of the Eider lies E.S.E. $\frac{1}{4}$ E. from the Heligoland lighthouse, distant 22 miles; N.E. by E. from the red buoy of the Elbe, distant 13 miles; and E.N.E. from the Schlussel, or outer buoy of the Weser, distant 29 miles.

A light-vessel, with one mast, is stationed at the entrance of the Eider, between February and November. Besides being painted red, with a white streak, in the daytime a small Danish flag is hoisted at the fore-top, 60 feet above the water; and in the night a lamp-light is shown, at the height of 34 feet. When the vessel bears E. by S. it may be approached with safety. On board are pilots to convey you to Husum, Tonningen, and the Elbe. When in thick weather, a cannon is discharged, or a bell tolled, they are signals to a vessel in sight, that she is taking a wrong course.

For entering any of the ports between the Elbe and Horn Point a pilot is indispensably necessary.

The channel to the entrance of this river is regularly buoyed, with black buoys on the starboard, and white buoys on the port side; beyond which, the courses in the different reaches, which are very circuitous are pointed out by beacons on the edge of the sands, which are mostly dry at low water.*

* The Director-General of Customs and Commerce has given notice under the date April 25th, 1843, that instead of the Eider Channel, near the Kuller Sand, which has been found to be inaccessible to large ships, another channel through the so called Peter Carston's Lock, is to be substituted. The entrance to this channel is, coming from the south and north rock, near the Black Steil buoy No. 14, or the white buoy No. 11. Besides these two buoys, there are also, as marks, on the south side of the Steil buoys Nos. 15 and 16, as also along and between both the buoys Nos. 14 and 15, several beacons; and on the north side of the White Steil buoys Nos. 12 and 13, at the shallowest part, between the black buoys Nos. 15 and 16, the water, at an ordinary ebb-tide, does not exceed 6 feet. The course along this channel is N.E. and N.N.E.—*Tonningen Royal Pilot Inspectorate, May 11th*, 1843.

CANAL.—For the purpose of facilitating the communication between the North Sea and Baltic, a canal is cut across the Duchy of Holstein, from the River Eider, which passes by Rendsburg, to about 3 miles north of Kiel, at the mouth of the River Lerwensawe. The Eider is navigable more than 6 miles above Rendsburg; and the distance, from the western sluice of the canal at Rendsburg, to its commencement, near Kiel, is 20½ English miles.

The perpendicular fall of the canal, towards the Baltic, is 25 feet 6 inches; that towards the North Sea, 23 feet; and vessels passing through, are raised or let down by means of 6 sluices. The breadth of the cut is 100 feet at the top, and 54 at the bottom; the sluices are 27 feet broad, and 100 feet long; and the lowest depth of water is 10 feet. Merchant-vessels, of 120 tons, may therefore sail through this canal: and the distance from Tonningen to where the canal joins the Baltic, is 65 miles.

This canal was intended to facilitate the commercial intercourse between the towns of Bremen, Hanover, and Westphalia, which heretofore had been carried on by the Weser and Gluckstadt to Hamburgh and Lubeck, and also to transport the merchandise of Holland and the North Sea to the Baltic; but the *numerous shoals* of *shifting sand* found between Rendsburg and Tonningen, very much impede its expected success.*

The RIVER HEVER lies to the northward of the Eider, its outermost red buoy bearing from the outermost black buoy of the Eider, north, distant nearly 8 miles, and from the lighthouse on Heligoland, east, distant 21 miles: in the vicinity of the buoy are 5, 5½, to 6 fathoms: but there are so many inlets and openings to go into along this coast, and the sand-hills on the different islands are so much alike in appearance, that no description is sufficient to guide a stranger. When, therefore, a ship is entangled and unable to clear the coast, you must trust to the chart, wherein the several channels and sands are faithfully expressed. On seeing the breaks on these sands, you may form a good idea of their similarity; and knowing their situation, must steer in accordingly, anchoring as soon as you think your ship can ride; but should you perceive any sand outside of you, before you have touched the ground, or become leaky, you must push on for smooth water.

NEW, or NY SMAL DIEP.—The entrance to the Smal Diep is now marked out by a light-blue outer buoy, with a pole, on which a basket is attached: it lies in 4½ fathoms at low water, a mile without the No. I black buoy. This channel is also regularly buoyed and beaconed. Observe, the outer blue beacon-buoy lies with Sea Sand beacon N.E. ½ E., and Pillworm steeple E. ¾ S.

GAMMEL SMAL DIEP lies to the southward of the Ny Smal Diep, about 3½ miles; it is not buoyed off, and to enter it you must cross a *large flat* of 3 fathoms, with Sea Sand beacon bearing N. by E. ¼ E.; but no stranger should attempt it.

RYTTERDYB.—This channel leads up to WYCK in the Isle of Fohr, and has a good depth of water in it from 4 to 11 fathoms, but its entrance is obstructed by a *bar*, of 12 feet, which lies with Sea Sand beacon bearing E. by N., distant 4 miles. The Ny Smal Diep, which is regularly buoyed, joins this channel about 2 miles northeastward of Sea Sand, and leads to Amrum and Fohr Islands. At the entrance of these channels, between the Elbe and Fartrapdyb, it is high water, on full and change days, at 12 o'clock.

At Wyck Harbour, in Fohr Island, and on the Dyke at Dagebull, are two small fixed lights at each place.

FARTRAPDYB. — The entrance to this channel lies 5½ miles northward of Rytterdyb and west of the mill near the centre of Amrum Island; it is marked out by two beacon-buoys, the southern one black, and the northern one white, there are also beacons within the channel, which lead to a haven on the west side of Amrum.

We have already stated that, for all these places between the Elbe and Horn Point, a pilot is indispensably necessary.

AMRUM BEACON.†—For the safety of vessels bound for the harbours or rivers in the neighbourhood of Heligoland, and carried by accident, or otherwise, to

---

* The number of vessels that passed this canal in 1843, was greater than in any previous year, viz:—3865 vessels. Coffee and sugar are the principal articles, as regard duty, which pass through the Canal of Holstein.

† A lighthouse is in course of erection on Amrum Island.

the northward of that island, a beacon has been erected on the sand-bank which lies 4 miles to the south of Amrum, and to the north-west of the isle of Pillworm; and which, in ordinary floods, rises 5 feet above the surface of the water. The height of this beacon is 60 feet. It may be seen at the distance of 12 miles; appearing at first like a sloop, with her top-sail set. From the light on Heligoland, the beacon bears N.E. by E. ¼ E., distant 27 miles.

The advantages to be derived from this beacon are as follow:—First, it serves to point out the sand-banks in that part. So soon as it can be distinctly seen from the deck, the vessel should not approach nearer; for then the soundings will be from 6 to 5 fathoms, and the distance 8 miles. Second, the beacon serves also as an excellent mark for enabling vessels to regulate their course. When it is seen at the distance of about 8 miles, and bearing nearly east, it gives the following magnetic courses and distances, regard being always had to the state and direction of the tide:—

To the island of Heligoland S.W., 18 miles; outermost red buoy of the Elbe, S. ¾ W., 30 miles; outermost black buoy of the Eider S.S.E., 23 miles; outermost red buoy of the Hever S.E. by S., 12 miles; outermost blue beacon-buoy of the Smal Diep S.E. by E., 4½ miles; and Lister Diep N.E. by N., 35 miles.

Third.—The beacon further serves as a particular mark for directing the navigation to these dieps and rivers.

To make the Smal Diep.—The beacon must be brought to bear N.E. ⅜ E. from the vessel; and this course must be kept till within 4 miles of the beacon, where Pillworm old tower, bearing E. by S., the outermost blue beacon-buoy of the Smal Diep will be found in 4½ fathoms. In clear weather, the beacon may be brought within ⅛ of the compass to the east of the outermost corner of Amrum, and the Pillworm old tower between North and South Oog (or Oye), but nearer to the first, in the proportion of one to two.

To make the Hever.—Let the beacon be brought 8 miles to the east; then let the above-mentioned course (S.E. by S.) be kept till the North Hoft (or Head), that is, the N.W. part of the land of Eidersted, is seen E.S.E., or till the church and steeple of Wester Hever come clear of the Sand Downs; then the beacon, which can be distinctly seen, bearing north, the outermost red buoy of the Hever will be discovered.

To make the Eider.—Let the beacon be brought 8 miles to the east, and let the course be S. by E. ½ E., till the beacon disappears to the north. The Sand Down of Eidersted will then be discovered; and the course must be continued so long to the southward, in from 4 to 3½ fathoms, till the two beacons on Sud Hoft, or at St. Peter, appear in a straight line, bearing E.N.E., when the outermost buoy will be seen.

Lister Diep.—In the same manner the beacon is of advantage for making the Lister Diep; for so soon as it disappears to the south, the island of Sylt will be discovered; and when the middle of the island, called Roth Cliff, appears in the east, the course may be directed northward, very near the coast, till the point of it is reached; then hauling to the east and south-east, good anchorage may be found behind the Leist.

On Hornum Head, the south point of Sylt Island, is a beacon, 101 feet above the surface of the sea, which serves as a mark for the uniform line of coast along the Downs, from Roth Cliff to Hornum Head, and also for a warning mark for the dangerous shoals running far out in a S.W. direction from Hornum Head.

The entrance to Lister Diep is called *Soltsand Dybet*, and is in latitude 55° 3′ north. There are two light beacons erected on the north end of the Island of Sylt, showing fixed lights visible from 14 to 16 miles distant. These lights, kept in one, in about E.S.E. ½ S., lead to the deepest part of the bar in the principal channel for entering List Roadstead, with 15 feet depth of water, at the usual low water mark.

When the depth of water, after passing the bar, increases to 6 and 7 fathoms, the lights, in order to go clear of the Solt Sand, must no longer be kept in one, but a more easterly direction must be taken for the channel, as laid down in the chart. The beacon lights will be best seen when coming in from the northward. When the beacons bear from east to E. by N., the shoal water of 9 to 12 feet runs off full 2 miles from the island, and forms the south boundary of the channel, and a *dangerous shoal* of only 6 feet bounds the north side. To enter this anchorage a pilot is necessary. Lister Diep leads up to HOYER, in SLESWIG. A *flat*, of 7 to 8 fathoms, extends full 5 leagues from the List lights. High water in the Diep, on full and change days, at 2h,

KNUDE DYBET lies 15 miles N.N.E. of Soltsand Dybet. There are two buoys on the bar, on which is only 9 feet, and 2 beacons on a sandy island, southward of the Island Fano. It is only fit for small vessels; high water on the bar, full and change days, at 1h. 30m.

Directly opposite to Amrum Island, and at about the distance of 10 or 11 miles, lies a *bank*, of $4\frac{1}{2}$ and 5 fathoms water, stretching N.N.E. and S.S.W., 10 miles. It is commonly called *Amrum Bank*. Its outer edge is steep-to, with 6 to 8 fathoms close to it, and within it are 6 fathoms, the depth decreasing gradually towards the shore. There is also a *similar sand*, but more irregularly shaped, called *Rode Klif Sand*, lying to the northward of the entrance to the Lister. This bank runs nearly N.E. by N. and S.W. by S., 7 miles, with only 4 and $4\frac{1}{2}$ fathoms upon it; its south end lies W.N.W., 9 miles from Romo Island; and between its northern end and the *dangerous shoals*, which run off 11 miles, is a passage, 3 miles, with 6 to 5 fathoms in it.

VARDE.—The harbour of Varde lies to the S.E. of the Horn Point. It has, upon the bar, not less than 18 feet at high water. There are two buoys at the entrance, which are to be left on the port side. The harbour may be known by a small white steeple on the north side, and the great steeple to the southward of it; but strangers should not venture in without a pilot.

HJERTING may be termed the sea-port of VARDE, and is likely soon to become of considerable importance, and the best port on the west side of Jutland. It has lately become a steam-packet establishment. Great quantities of cattle and other produce of Jutland is now shipped at Hjerting for the English market.

The *Bar of Hjerting* lies 12 miles S.S.E. from Horn Point. There are two entrances into the channel, $1\frac{3}{4}$ mile apart, and is separated by a sand called the *Smor Sand*, $1\frac{1}{2}$ mile in length, which nearly dries at low water. The northern bar is called the Fisher's Gat, and has only 9 feet on it. The southern and principal channel is called Graa Dybet, and has 12 feet in it at low water, and is sheltered from westerly winds by the Smor Sand.

There are two buoys without this bar, nearly a mile apart, and on Fano Island there are three beacons, built with piles: these stand near the north end of the island, and serve as pilot-marks for entering the channels. The western beacon, when brought in a line with the northern beacon, which is the largest, and bearing E.N.E. $\frac{1}{4}$ E., nearly, will lead up to the southward of the two outer buoys; when up to the second buoy, which lies at the south end of the Smor Sand, you are at the entrance of the narrow channel which leads across the bar, and must haul suddenly up to the northward, the course is across the bar from the second buoy, about N. $\frac{3}{4}$ E. for 2 miles, when you will deepen your water to $4\frac{1}{2}$ fathoms, and the channel then runs more easterly to the anchorage, in 7 fathoms; only small vessels can get up to the town, which is about 6 miles from the bar.

There are two floating-beacons on the inner or eastern edge of the Smor Sand, which should be left on the port hand when crossing the bar. No strangers should attempt the bar of Hjerting without a pilot. The west side of Fano Island should have a berth given it of at least 2 miles, as you will only have 3 fathoms at that distance from it.

The HORN is a sandy steep point, of moderate height, bearing from Heligoland N.E. by N. $\frac{1}{2}$ N., distant $27\frac{1}{2}$ leagues. From this point *extensive reefs* and *shoals* stretch out to the westward full 15 miles, and are formed of long ribs, or hard shallow ridges of sand, with channels of deep water between them; their eastern edge is detached from the Horn Sandy Point about 3 miles, and has two channels, of 4, 5, and 6 fathoms, between; but these passages are encumbered with *several dangerous knolls*, and the mariner who ventures through them, must be very cautious, and keep his lead continually going.

The *Horn Reefs* are *very dangerous*, and numerous vessels have been wrecked upon them; but their extent has lately been examined, and it appears there is good anchorage within them, even with on-shore winds. The land to the southward of Horn Point has a flat appearance. In coming in from the southward of these sands, you should endeavour to bring the great steeple of Varde to bear E.N.E.; you will then perceive the breakers on the sands, especially should there be any swell of the sea. By these you must steer, and haul up inside of them, at about 3 or 4 miles from the land, Horn Point then bearing N.N.E. You may work within the sands, standing in 4 and off to 8 fathoms, anchoring on either side of them, as may be most convenient, but if you get to the northward of these sands, and are unable to clear them, you will not find

the shelter there so good as to the southward; you had, therefore, better anchor before you see the land. The outer point of the sands is shoaler than farther in, being a long flat, of 6 and 7 fathoms; but from Varde Bar, or Fisker Dybet, to Horn Point, the riding will be found good, about 3 or 4 miles from land.

Should a ship get among these sands, not understanding on which side of them her situation is, and being unable to return the way she came in, she will meet with some places of 8 and 9 fathoms, where she ought immediately to anchor; for should she, in endeavouring to extricate herself, be obliged to drive from sand to sand, it will seldom fail terminating in a wreck. The above are from the observations of an officer in the British Navy. By a late Danish survey it appears that the outer Horn Reef Sands extend from Horn Point N.W. by W. ½ W., full 15 miles, terminating in *several shoals*, with from 9 to 15 feet on them: from thence *various shoal banks* stretch south-eastward 15 miles. Between their eastern end and the shore are two channels, of 4 and 5 fathoms water. The outer one is called the Wetser Stuge, the inner one Ringkiobing Diep. This latter passage is bounded to the eastward by the in-shore sands, and to the westward by a bank, about 4 miles long. This channel has from 3½ to 5 fathoms water in it; and vessels may ride there, having Horn Point bearing E.S.E. ½ E., distant 3 miles.

The outer passage is broader, and formed by the above banks and the Horn Reefs. In this are from 4½ to 9 fathoms; but there are *two small knolls* at the southern entrance of these channels, called the *Knob* and *Cancer*, which must be guarded against. Between these shoals are 4½ fathoms; between the Cancer and the sand which stretches from Horn Point, 7 fathoms; and between the Knob and the Ujevm Bank 4 fathoms. To the southward, between Horn Point and Sylt Island, the soundings toward the shore gradually decrease from 10 fathoms, which depth will be found about 20 miles distant from Sylt Island, and bearing W. by S. from the entrance to Lister Diep, to 3 and 2 fathoms at its entrance. N.N.W. ½ W. from Horn Point, distant 11 miles, lies the *Wejers Bank*, having 5 fathoms over it: and in the same direction, 7½ miles farther off, is the *Knolden*, of 7 fathoms. Round these are 8 and 9 fathoms, and between them 16 to 15 fathoms, with a *few spots* of 9 fathoms, then 10, 8, and 4, as you approach the land.

From Horn Point, the shore extends N.E. by N., 15 miles, to the entrance of Ringkiobing Fiord, the channel of which is pointed out by two beacons. A narrow isthmus, called Numet Land, which is very extensive, separates the Fiord from the sea. The land then stretches N.N.E., 45 miles, to Round Head, Bovenbergen, and thence more to the eastward, towards Holmen, commonly called the Holms. From Holmen its direction is E. by S. to Bolbierg, and thence it forms a kind of circular bay towards Robsnout. Robsnout bears E. ½ N., distant 43 miles from Holmen. From Robsnout to Hirtshalls the coast runs N.E. by E. ½ E., 10½ miles, and then turns more eastward to the Scaw, the distance from Hirtshalls to the Scaw being 23 miles.

AGGER CHANNEL, *from the North Sea to the Cattegat.*—Early in the year 1836, it was announced that the sea had made an irruption on the west coast of Jutland, through a narrow tract of land, which formed a barrier between the sea and the Liim Fiord, a large inland lake, which communicates on the east coast with the Cattegat. The aperture thus formed, called the Agger Channel (from its immediate proximity to the fishing-village of Agger), is situated in latitude 56° 41′ north, and establishes a junction with the Liim Fiord and the North Sea, by which this northern part of the peninsula is perfectly isolated.

In reference to this channel, (the Agger,) the Lords Commissioners of the Admiralty received a dispatch from the British Consul at Elsinore, of which the following is an extract:—

"With a view of facilitating the navigation through that (the Agger) channel, the Danish Admiralty, by an order, dated the 7th of April, have sanctioned the erection of a pilot establishment at its entrance from the North Sea. In consequence, to the south of that entrance, on a sandy eminence, and near a temporary watchhouse, has been placed a signal post, the flag of which, hoisted at top, signifies that the vessel has been observed, and that the assistance of a pilot is offered. The said flag being lowered once, denotes 1 foot of water; twice, 2 feet; three times, three feet; four times, 4 feet; five times, 5 feet; six times, 6 feet; and so forth. After this the pilots go out towards the vessel to make the customary signals.

"The rate of pilotage payable, according to a tariff exhibited in the pilot-office, has been fixed for the present, at two rix bank dollars, silver, (equal to 4s. 6d. sterling) per

foot of the ship's draught of water; and in the winter season at one-third more, which rate will be eventually reduced one-third more, should the navigation of the channel increase. Ships entering from the North Sea, may obtain pilots for the several ports and places situated in the Liim Fiord.

"According to the soundings, which have been taken at different periods, the depth of the western entrance varies from 5 to 7 feet; and at the eastern entrance, from $5\frac{1}{2}$ to 6 feet. In the channel itself, which affords good anchorage, the depth, both from the frith and the sea, increases to 18 feet; which depth, however, is subject to continual changes. The mouth of the channel, towards the sea, is about $\frac{1}{2}$ a Danish mile, or 2 nautical miles wide; but farther up towards the frith, it declines from 250 to 50 fathoms. Its length from the sea to the commencement of the frith, is supposed to be $\frac{3}{4}$ of a Danish mile, or 3 nautical miles.

"Any alteration in the course or depth of this channel, as well as the names of the vessels frequenting it, will from time to time be communicated in the Danish papers." —*Elsinore, May 14th*, 1836.

Hantsholm lighthouse, N.W. coast of Jutland (in latitude 57° 6′ 50″ north, and longitude 8° 36′ 10″ east), exhibits a revolving light, 218 feet above the level of the sea, and visible 18 miles. This light will show a flash, of 15 seconds' duration, every $\frac{1}{2}$ minute, and therefore, will be easily distinguished from the Scaw light, which is fixed, as well as the Norwegian light on Oxce, which is also fixed.

The coast from Horn Point to the Scaw is generally low, and not to be seen above 4 or 5 leagues off; but the following places will be visible at a greater distance, viz.: —A round hill to the northward of Horn Point, a white sand-hill to the northward of Ringkiobing, the high steeple-cliffs of Bovenbergen, the Holms, or Holmen, Robsnout, and Hirtshalls. Robsnout is a high bluff round hill, with a church at the top, and may be seen 6 or 7 leagues. Holmen makes like islands; and Hirtshalls is a long smooth hill, low in the centre, and steep at the east end. In the bight, between Robsnout and Hirtshalls, is a remarkable church, with a square steeple. The Scaw Point is very low, with a lighthouse, painted white, upon it, bearing a fixed bright light, 69 feet above high water, and visible 13 miles, which is continued throughout the year. From off its point a *rocky reef* extends $2\frac{1}{2}$ miles, its N.E. extremity lying with the church and lighthouse in one, bearing W. by S. The north side of the reef is steep-to, and should not be approached nearer than 10 fathoms.

As it may be of importance to all ship-masters, who, in the winter or in the early part of the spring, are coming from the Sleeve to the Cattegat, to be informed if there be any drift-ice in the Cattegat, it has been ordered that a white flag, with a perpendicular blue stripe in the middle, is to be hoisted, during the day-time, from the lighthouse upon the Scaw Point, as often and so long as ice may be visible from the lighthouse, to such an extent, and in such a quantity as might be supposed to obstruct the navigation of the Cattegat, &c.

About 4 miles off the land, about Holmen, is a *sandy ridge*, of 11, 12, and 13 fathoms, while close inside its edge are 19 and 20 fathoms, and between it and the shore 17, 16, 14, 7, and 6 fathoms, decreasing as you get nearer to the land. Nearly N.E. from Holmen, distant 5 miles, is a *dangerous rocky spot*, of 2 fathoms, called the *Stone Bank*; and within it, somewhat nearer to the shore, is *another shallow bank*, or *knoll*. Both of these have deep water round them. Great care, therefore, must be taken to give the Holmen a wide berth in passing. Off Bolbierg western point also is a *rocky reef*, stretching to the northward, called *Bragene*. N.E. from the same point, distant $8\frac{3}{4}$ miles, and E. by N. from Holmen Point, distant 17 miles, is a *rock*, under water, called the *Vester Yder Hag*, having $7\frac{7}{5}$ fathoms on it, with deep water (9 and 11 fathoms) close to it. E. $\frac{1}{2}$ N., $30\frac{1}{2}$ miles from the Holmen west point, and W. by S., 11 miles from Robsnout, lies the *Lokken Rock*, with 13 fathoms close to the inner side. W.N.W. $\frac{1}{4}$ N., 2 leagues from Robsnout, is the *Bakken, another rock*, of a similar description, having $4\frac{1}{2}$ fathoms over it. E. $\frac{1}{2}$ N., 3 miles from which is a *rocky patch*, of $3\frac{1}{2}$ fathoms, called the *Red Ground*; and W.N.W., 2 leagues from Hirtshalls, is a *second spot* of *red ground*. S.W. $\frac{1}{4}$ W. from this latter is a *similar spot*, distant 2 miles. There are also *some rocks* under water about Hirtshalls with 10 and 12 fathoms close to them. These latter are *very dangerous*, and many vessels have been lost upon them. There are also *two banks* nearly parallel to, and about 5 miles from the shore, upon which are 5 to 10 fathoms. Between them and the shore are from 12 to 4 fathoms, and outside of them very deep water.

SAILING DIRECTIONS FROM HELIGOLAND TO THE SCAW.

VESSELS bound from Heligoland to the Scaw, should take a N. ¼ E. course, full 30 leagues, by which they will be carried to the westward of all the dangerous sands about Horn Point, in from 12 to 20 fathoms water, all sandy ground. Having passed these reefs, they may proceed N.E. by N., 20 leagues, or to abreast of Bovenbergen. Then a N.E. ½ E. course, 12 leagues farther, will bring you into the latitude of the Holmen, near which is a lighthouse already described. The Depth decreases all the way towards the shores of Jutland, but without any danger. The current, however, frequently sets strongly to the north-eastward in this part, which should be particularly guarded against in hazy weather; for between Bovenbergen and the Holmen, it will be difficult to ascertain by the lead your distance from the land, it being an extensive flat. As soon as you arrive in the latitude of the Holmen, you will have deep water—nearly 30 fathoms at 5 leagues from the land. Here the deep-sea lead should be particularly attended to: in dark weather it is your safest guide. Vessels have often been lost near this part of the coast, during north-westerly winds, by keeping away too soon.

The new light on Hantsholm will be of the greatest service to mariners navigating this part of the coast. But when Holmen comes S.E. by S., steer E. by N. for 18 leagues, and keep at least 10 miles from land, for within this tract are *several rocks*, under water, with deep water all round them. The situation of these have already been described. Give them a good berth; and when Hirtshalls Church bears S.S.E. from you, an E.S.E. course will take you clear to the Scaw.

When the Holmen bears S. ½ E., distant 10 or 12 miles, it has the appearance of several detached islands, with a church to the south-westward, the surrounding land being too low to be seen. That *extensive bank*, called the *Jutland Reef*, runs along shore all the way to the Scaw. The depths over this part of it are various and irregular. Abreast of the Naze of Norway, its boundary appears to be in latitude about 57° 28′. Opposite to the Holmen it advances towards the north-eastward; and abreast of the Scaw it reaches to nearly 58°. This will best be understood by a reference to the chart.

As you advance you will readily discover the Scaw light; and if bound into the Cattegat, can easily give that a sufficient berth in rounding it, to avoid the reefs which run off it. The lighthouse and the church are conspicuous objects, and when the weather is clear, will be visible 3 or 4 leagues. If desirous of anchoring on the south side of the Scaw, you may bring-up, with the lighthouse bearing N. by W., in 8 or 9 fathoms; and here, with westerly winds, you will ride in safety. Pilots are always to be obtained from the Scaw to take you up the Cattegat.

It is high water, full and change, at the mouth of the Eider, at 12 o'clock; at Horn Point, at 12h.; and at Ringkiobing Fiord, at 20 minutes after 11h.

TIDES.—The tide rises at Heligoland about 9 feet. At Bovenbergen there is very little rise or fall, the water generally being governed by the prevailing wind. Between the Horn Point and the Elbe and Weser, there is commonly an indraught to the south-eastward. To the northward of Horn Reef, about Holmen, the current with westerly winds, will run at the rate of 2 miles an hour; and with strong S.S.W. gales, it increases its rapidity to 3 miles: a circumstance which should be particularly attended to, especially in dark weather.

THE COAST OF NORWAY,

FROM THE NAZE TO CHRISTIANIA.

Description of the Land, &c.

THE whole coast of Norway is very irregular and mountainous. The points of land, which extend considerably into the sea, form innumerable bays; many of which are wide and deep; and the numerous islands and rocks which lie along the coast, make many of those bays excellent harbours. Although those very islands and rocks which make the harbour safe and commodious to lie in, render them difficult of access, that difficulty is, in a great measure, obviated by the certainty of getting good pilots, who frequently come off when the sea is so high, that they are obliged to sling themselves in a rope, and be taken into the ship over the quarter.

Vessels on making any part of this coast, should signal for a pilot in time, by firing a gun, and hoisting a flag at the fore as usual.

LINDERSNAES, or the NAZE, is a reddish bluff headland, and well known, being the most southerly cape of Norway. It has a circular white stone light-tower upon it, showing a revolving light with a flash every minute, elevated 153 feet above the level of the sea, and visible 22 or 24 miles. Over it, a little inland, is the high land of Spangereid, generally covered with snow in the spring, and which, in clear weather, may be seen at the distance of 12 leagues from the coast.

About S.E. by E., distant 8 miles from Mark-Oe, and $5\frac{1}{4}$ miles from the Naze, is a *very dangerous rock*, called the *Gieslingene*, or *Swine Rock*, upon which many vessels have been wrecked. There is a good passage between it and Udvar Islands, which lie to the north-eastward.

MANDAL.—At 4 leagues E.S.E. from the Naze, lies the entrance of Manne Fiord, the haven of the trading town called Mandal, where pilots may readily be obtained.

HELLIS-OE.—At the distance of 4 leagues to the eastward of the entrance of Mandal, and 4 miles westward of the island called Flekker-Oe, lies the island called Hellis-Oe. This place is distinguished by two towers, or beacons, painted white, with a high bar upon each, so that they may, in light weather, be seen at the distance of 3 or 4 leagues.

FLEKKER-OE-HAVEN.—The west gat of the haven of Flekker-Oe, lies $3\frac{1}{2}$ miles to the eastward of Hellis-Oe. This harbour is well known.

CHRISTIANSAND.—Christiansand is one of the chief cities of Norway; said to contain 135,000 inhabitants, and carries on a very considerable commerce, principally in the exportation of timber, and the fisheries. The town is built upon a sandy plain, close to the sea; and has one of the best harbours in Norway, for vessels lie almost close to the doors of the warehouses. Ship-building is carried on here to a great extent. The island of Flekker-Oe forms, with the main land, a roadstead of several miles long: and there is good anchorage, in 8 or 9 fathoms. It is much frequented by shipping, which may here be repaired; and mariners may obtain, in case of accident, all assistance that may be required.

Numerous harbours lie along the coast to the eastward of Christiansand, with the towns of Lillesand, Grimstad, Arendal, Twedelstrand, Oester, Riisoer, Krageroe, Skeen, and Laurvig, &c.; to the eastward of which is Christiania Fiord. Here, at the western side of its entrance, is the small island of Færder, on which stands a lighthouse; and farther on, is the Fugelhuk Rock, where a revolving light has lately been erected, to guide vessels to Dram and Christiania.

The south and east coasts of Norway are distinguished by an additional number of beacons, or marks, by which the mariner will be enabled to ascertain the situation of his vessel with great facility. These are constructed of different shapes, and exhibited upon the charts of the North Sea and Sleeve, published by the proprietor of this work, being situated as follows:—

The *first* is on Fero, at the entrance to Fahrsund, and bears N.W. $\frac{3}{4}$ N. from Mark-Oe, distant $6\frac{1}{4}$ miles. It is 28 feet high, has a sloping kind of roof, and the whole is painted red.

The *second* is built upon the Ryvingen Rock, nearly 15 miles to the eastward of Lindersnaes lighthouse. It is $30\frac{1}{2}$ feet high, and pointed at the top.

The *third* is upon the Island Hellis-Oe, described above.

The *fourth* stands upon the island of Ulvoe, on the eastern side of the entrance to Christiansand, and 26 miles to the eastward of the Ryvingen Rock. This is 31 feet high, and has a cross at its summit.

The *fifth* is erected upon the Nodingen Rock, a little to the southward of Justoe This is $26\frac{1}{2}$ feet in height, being a round building, with a long cross over its roof.

The *sixth* is situated at Homborgoe, eastward of Lillesand. This sea-mark has the appearance of a windmill, the vanes of which describe an angle of 45 degrees towards the horizon. It is painted yellowish, and visible at the distance of 10 or 12 miles.

The *seventh* is situated near the entrance to Grimstadt, and built upon Hesnæsoe, and about 13 miles to the north-eastward of the Nodingen beacon. It is of a triangular form, with a long pole projecting upwards, its height being 31 feet.

The *eighth* is erected on the Bonden Rock, at the eastern entrance into Tromoe Sound, having the appearance of a shortened cone. It is painted yellow; is 14 feet high, by 8 feet in diameter; and is 30 feet above the level of the sea. It may be clearly seen 7 or 8 miles.

The *ninth* is erected upon the island of Sandoe, and presents a column, tapering upon the base upwards, its height being 33 feet.

The *tenth* stands on Svenoe, and is erected on four piles, being surmounted by a cross; in all 30 feet high. The appearances of these beacons cannot fail of being eminently serviceable to the navigation of this part of the coast of Norway.

OX-OE LIGHT.—A lighthouse is erected upon Ox-Oe islet, to the east of Flekker-Oe, at the eastern entrance to Christiansand, which exhibits a fixed light 135 feet above the surface of the sea, and is visible in clear weather at the distance of 18 miles.

In connection with the above light, a fixed light is shown on Oddero Island, 4 miles N. $\frac{1}{4}$ W. from Ox-Oe, visible 10 miles. The light towards the sound is shown all the year, but towards the harbour not between 31st May and 1st August.

ARENDAL LIGHTS.—A fixed light on Great Torungerne Island, in latitude 58° 23′ 15″ north, and longitude 8° 52′ 30″ east; and a fixed light on Little Torungerne Island, bearing from the light on Great Torungerne Island, N.N.E., 1,237 yards. Both the above lights are visible in all directions; and, being 138 feet above the level of the sea, may be seen at the distance of 18 miles.

A fixed light is placed on Sandvig Point, at the entrance to Arendal, 44 feet above the level of the sea, visible 10 miles on any bearing westward of south, and E.N.E., unless concealed by adjacent land. The buildings of the above three lights are white.

There is also a lighthouse on Jomfruland, in latitude 58° 51′ north, and longitude 9° 41′ west; it is 138 feet high, with a revolving light, which shows a bright flash every $\frac{1}{2}$ minute.

LANGOSUND.—On Lango Island is a fixed light, visible 11 miles.

SAILING DIRECTIONS FROM THE NAZE TO CHRISTIANIA.

When you are steering towards the Naze from the southward, you must, after crossing the *Dogger Bank*, be cautious, and sound in time for the *Jutland Reef*, especially with southerly and S.W. winds, for then the current sets strongly to the northward. Between the north end of the bank and the reef, you will have from 30 to 38 fathoms water. The depth on the reef will be less; but after crossing it, you will immediately have deeper water again.

Having crossed the Jutland Reef, and approached within a few leagues of the land, if by night, and clear weather, you will discover the Naze light. Should you happen to be running in between the Naze and Mark-Oe, do not bring the light on the Naze more southerly than S.E. by E., in order to avoid the *Bispen Rock*, and *some ridges* within it. But should you come to the eastward of the Naze, approach no nearer to the land, than to bring the Naze light N.W., in order to keep clear of the *rocky islet*, called *Gieslingen*, which bears S.E. by E., about 5$\frac{1}{4}$ miles from the Naze.

Coming from the westward, with a strong gale of westerly wind, by day, and being desirous to put into one of the havens on the east side of the Naze, the best way will be to pass the point; and when round it steer to the N.E. for the passage, when pilots will most likely come out; but should that be impossible, haul off, and pass to the westward of the Gieslingen, which is always visible above water, and on which the sea constantly breaks.

MANDAL.—In proceeding for this place, you will endeavour to obtain a sight of the Naze, and proceed in such a manner as to avoid the Gieslingen. The entrance of Mandal is known by two hills upon the coast, on the east side, called the Cow and Calf. When you have advanced so far to the eastward as to open these hills clear of Hellis-Oe, which is high and pointed, or still farther, until you are directly off Manne Fiord, when the two hills appear in a line, or become hidden by the eastern land, you will be able to determine where you are, and may haul somewhat nearer in to the east of Hellis-Oe, where you will have a good mark in the yellow sand, which is on the west side of Mandal, and which may be seen very plainly at some distance

from the sea; and on the east side is the Ryvingen beacon, 30½ feet high, and pointed at the top. Here a pilot may be obtained for Christiania.

HELLIS-OE is a small island, and, as before observed, distinguished by two towers, which serve as a mark for this part of the coast, there being no other remarkable objects hereabout, the land stretching evenly along. These towers are painted white, with a high bar upon each, so that, in clear weather, they may be seen at the distance of 3 or 4 leagues; and, though they stand near each other, yet they never appear as one, unless you be quite in among the rocks, which, hereabout, lie a full league from the shore; they afford a mark particularly useful, and cannot be mistaken. By a bearing of this mark, the mariner will be enabled to ascertain his situation, and determine where best to stand in for the land. Within Hellis-Oe is one of the best havens on the coast for ships, of all sizes, to stop in.

FLEKKER-OE HAVEN.—The entrance is divided by the island Flekker-Oe into the East and West Gats, the latter of which lies 3½ miles to the eastward of Hellis-Oe. Upon a small island in the bay, is the fortress or castle, which is very remarkable when before the entry, and not hidden by Flekker-Oe. This harbour is capable of containing a number of ships, which are made fast by rings on the shore. The depth is from 14 to 18 fathoms; but far off, the bottom is, in several places, *rocky*, and, in some parts, apparently clean; the cables will frequently be found damaged. Ships of war, and other heavy ships, should lie to the southward of the castle, where there is some sea, when the wind blows directly in through the opening. As there are two entrances, ships may sail from this place with winds from W.S.W., round to north, and E.S.E. With westerly winds you may also go readily from hence, within the ridges, for Christiansand. At the south-west end of Flekker-Oe is Grundviigkil Creek, wherein ships, not drawing more than 10 or 12 feet water, may stand in 3 and 4 fathoms, sandy ground.

CHRISTIANSAND.—There are several good marks for standing in towards the entrance of Christiansand, particularly the two hills, called the Turned-up-boat and the Baksteen. In coming along from the west, or south-west, towards the land, the white towers of Hellis-Oe will be a good direction; and when you are off Flekker-Oe, and at some distance to the eastward, towards or beyond Randoerne, the opening will be seen that is formed by Torrisdal's River, which passes on the east side of Christiansand, appearing like a valley amongst high hills, of which those on the east side are steep. The small hillock seen up the mountain, is that called the Turned-up boat, or Omvente Baad.

About 4 miles to the west of the city, will be seen the Baksteen, resembling the crown of a hat, being steep on the south-west side. When coming near the mouth of the entrance, you will see the city with the bay, but you must then be somewhat towards the east side, or it will be hidden by Odder-Oe, which is high.

The marks before mentioned, will obviate all difficulty in sailing up to Christiansand, or to the East Gat, or passage of Flekker-Oe; and if the weather be not uncommonly tempestuous, you will readily obtain a pilot.

The more southerly ridge outside of Randoerne, may be approached within some cables' length, and all else the sea breaks upon. Randoerne is, in comparison with the other land, low and even.

The light on Oder-Oe Island will be seen, in clear weather, from the lower rigging bearing N. by W. ¾ W.; and by steering this course, and continually keeping Oder-Oe light in sight, all rocks and shoals will be avoided, until within 20 fathoms of the light, when the course must be altered to N.W. ¾ N. Continuing the last-mentioned course, steering in betwixt Oder-Oe Island and Dybingholm House, the lower lights on Oder-Oe lighthouse will be visible one after the other; then having passed 5 cables' length from this light, you may anchor in 30 or 40 fathoms.

It is to be observed, that the channel betwixt the shoals, near Ox-Oe and Groningen, where Oder-Oe light is visible, is 3 or 4 cables' length broad. In the middle of the said passage, on a N.N.W. ¾ N. course, the light will appear most luminous. On each side of this line of bearing, the luminous parts will decrease, and at last disappear you will then be 1½ to 2 cables' length from the nearest shoals.

At Christiansand are two harbours; but the western one is the most frequented, the passage being between Dybingsholm and Oder-Oe. You may leave it with all winds to the northward, between W. by S. and E. by S.; and in calm weather, when the wind is somewhat unsteady, you may warp out by means of the rings fixed for that purpose.

In the eastern haven, which is at the south side of the city, or east of Oder-Oe, ships may lie very well, especially those bound to the west, as they can conveniently come from it with a southerly wind, to the east and south-east.

On the east side of Oder-Oe, there is a safe and good harbour, called Hullet, which is now fitted up for a quarantine haven, where all ships from infected places, are compelled to come in, before they touch at other harbours.

In the mouth of Topdals Fiord, there is a very good and spacious stopping-place, called Wigehaven, which is much frequented by ships opposed by adverse winds, particularly those bound to the west. You can enter with winds from the N.W. to E.S.E. The depths are various, from 20 to 4 fathoms.

It is observable, that although Norway lies so far to the north, and under a climate where the winter is severe and long, the havens from Christiansand, westward, very seldom freeze up; and the out-havens never; but ships, at such a time, coming under the coast, may always find places of safety. Neither is drift-ice much known; for it can only happen in hard winters, that the ice out of the Cattegat and from the more eastern coast of Norway, can drive against the land about Christiansand, and somewhat more to the west, and then only in the latter end of the winter, in the months of February and March; but westward of the Naze, an instance of the ice having been a hindrance to vessels coming into any of the harbours that lies nearest to the sea, has scarcely ever been known.

On the coast of Norway, before described, there is, apparently, no rise of the tide; but allowance must be made for the current, which commonly sets to the west and N.W. This fluctuates according to the season, and other local circumstances.

HOMBORG SUND.—At the distance of 6 leagues north-eastward from Flekker-Oe, lies Homborg-Oe, or island, between which and the main is a passage, called Homborg Sund, containing several good anchoring places, both on the island and main side. This place may be approached with safety, and will be found by the bearings of Grimstad, Sadlen, and Hombergsundsfald. The passage in, is to the north-east of the island; and in order to avoid a *ridge of rocks*, which extends $\frac{1}{2}$ a mile N.E. from the end of the island, keep well over towards the main before you haul to the south-westward.

BIOR-OE lies about 2 miles north-eastward from Homborg-Oe. Small ships bound to the eastward, in the summer season, may stop within this island. The entrance is on its south-west side, and the harbour has from 2 to 4 fathoms water, on sand and grass bottom, with a ring for mooring by. With westerly winds, so far to the southward as S.S.W., you may sail out to seaward.

GROS FIORD, or GRIMSTAD HARBOUR, lies about 3 miles farther north-eastward. Here are several stopping-places, and various entrances. Large ships can go in but one way, namely, from the southward, and then only in moderate weather, with fair wind; because there are *several ledges of rocks and shoals* about. The other passages are *intricate* and *dangerous*. The harbour, however, is good, and has 11 or 12 fathoms water, clay bottom; but it can be left with northerly winds only. On the eastern side of the entrance, stands Hesnaesoe beacon, 31 feet high, of a triangular form, with a long pole projecting upwards.

ARENDAL HARBOUR is capacious, and capable of containing the largest ships. The entrance is 14 miles to the north-east of Homborg-Oe, and lies with the high land, called Grimstad Sadlen, bearing about W. $\frac{1}{2}$ N., and Homburgsundsfald N.W. by N. The church on Trom-Oe is another mark by which it may be known. This appears white, with a black roof, and is very conspicuous under the high double land. Arendal is one of the most considerable trading towns in Norway, and has three wharfs, where ships can be repaired. Large ships anchor in from 18 to 24 fathoms water, and moor fore and aft, by means of rings. Small ships lie in the pool, and at the different landing-places, according to circumstances.

Mœrd-Oe is an island lying directly off the southern entrance of the harbour of Arendal, and has within it several anchorages. Off the north side of it is an islet, called Skudholm, between which and Mœrd-Oe, is the anchorage, called Mœrd-Oe Harbour, where there are 12 fathoms water, upon a sandy bottom, shoaling towards the island, and deepening to the northward. For this reason ships do not ride quite so well here with southerly as with other winds, although the island affords them shelter, and is well provided with mooring-rings. With north-west gales there are frequently sudden gusts of wind from the main land. Notwithstanding these disadvantages, this place is much resorted to as a stopping harbour. As there is a channel

on each side of the entrance of Arendal Harbour, vessels may get away from it with all those winds with which they can clear the coast. It sometimes happens, however, that the wind is quite different within the entrance, between the high land, than outside, or at sea. Heavy ships can get out by the western passage only, and with the winds between N.N.W. and E.S.E. Between Mœrd-Oe and the island to the northward, called Jes-Oe, there is only sufficient depth for ships of 11 or 12 feet draught; and between Jes-Oe and the southernmost point of Trom-Oe there are only 7 or 8 feet water.

Directions for Arendal.—1. When about 2 miles from the land, a vessel should bring Sandvig Point light N. $\frac{1}{4}$ E., or a sail's breadth open east of Little Torungerne light, and keep along the land eastward of Little Torungerne for Sandvig Point light. The distance from Little Torungerne to Sandvig Point is a mile; when about 3 cables' length will lead to a good berth, in from 12 to 16 fathoms.

2. A vessel passing Great and Little Torungerne Islands, should keep $\frac{1}{4}$ of a cable's length from Great Torungerne. When Sandvig light bears N. by E. $\frac{3}{4}$ E., steer for it, and when within $\frac{1}{4}$ of a cable from it, may bring up. The first of the above channels is the easier for strangers.*

OSTER RIISOER is a populous place of active trade, and has a capacious and very good harbour, with various depths of water, from 4 to 24 fathoms, to which there are several passages, between the outer ledges and islets. It lies about $7\frac{1}{2}$ leagues to the north-eastward of Mœrd-Oe, and may be known by a large white-washed spot upon a rock on the hill close to Oster Riisoer; it is preserved so, to form a land-mark.

From Oster Riisoer vessels may proceed to sea on both sides, and with all winds, by which the land may be cleared. There are several places in the passage up wherein shipping may stop, but the channels are two intricate for a stranger to attempt without a pilot. Here is also a careenage, and all the materials kept for heaving down large ships.

From Oster Riisoer to Fœrder Island, the bearing and distance are E. $\frac{1}{2}$ N., 15 leagues. Between are several good harbours, namely:—Krager-Oe, Lang-Oe Sund, Porsgrund, Laurvig, and Sande Fiord. Krager-Oe and Porsgrund are loading-ports. Fœrder Island is remarkably high and conical, and lies near the range of islands on the coast, at the entrance of the Great Sound of Christiania. It has a lighthouse with a fixed light 209 feet above the level of the sea. When you get to Fœder Island, you must take a pilot, if you have not previously got one, who will conduct you to Frederickshall, Christiania, Dram, or any other adjacent port.

There is a lighthouse upon the Fulehuk Rocks, which exhibits a revolving light, in 3 minutes, showing a bright glare for the last 10 seconds, to distinguish it from Fœrder Island light. These Fulehuk Rocks lie about N.E. $\frac{3}{4}$ N. from Fœrder Island, distant 7 miles. Near Fulehuk light a bell is suspended, with which, in foggy weather, when the light cannot be seen at the distance of $\frac{1}{4}$ or $\frac{1}{2}$ a league, ten or twelve strokes will be given, at night, every $\frac{1}{4}$, and during the day every $\frac{1}{2}$ hour. In case the wind and sea should be so high, that a vessel cannot beat up for the coast, which will be very difficult, as the current sets on the shore with heavy gales, and having no pilot on board, she may with safety run in for Fœrder light; and from thence steer for the Fulehuk light, where, in tolerably smooth water, she can keep cruising in sight of the light until morning. She can always keep her position, as the current from Dram and Christiania will be under her lee side; or should a pilot be on board, he will from thence readily run her, at any time, to a good anchorage.

TONSBERG.—There are several towns and harbours situated in the Fiord of Christiania, where vessels occasionally resort. Of these, the first, or nearest to the Fulehuk light, is Tonsberg. This is an old town; and said to be the most ancient in the kingdom of Norway. Its harbour is capable of receiving large vessels; and its trade is chiefly in timber. The town has gone to decay, and now has not above 200 houses; yet it carries on a considerable retail traffic with several parts of the interior country.

A course N. by E. from Fulehuk Rocks will carry you up the Christiania Fiord,

---

* These directions do not agree with the Danish Chart, published in 1843, with Sandvig Point light bearing N. $\frac{1}{4}$ E. It is open to the westward of Littte Torungerne.—*Ed. Nautical Magazine.* Vol. XIII, p. 638.

In order to prevent any of the above lights from being mistaken for those of Mark-Oe or Lindersnaes, on the south part of Norway, the light of Mark-Oe was discontinued on the 1st of July, 1844.

nearly in mid-channel; and about 22 miles distant on the port side, is the town of Holmestrand, neatly built, with about 1,000 inhabitants; a little beyond which is the entrance to the Dram Fiord. This is a branch, or arm of the sea, running up to Bragernaes and Stromso, two towns which carry on a considerable traffic in timber and iron; the harbour admits only small vessels.

There is a fixed light on Basto Island, 40 feet above high water, to be left on your port had going up; and on Rodtangen, at the starboard entrance to Dram Fiord, is a fixed light, 37 feet high, and kept lighted from the 15th July to the 31st May, every night, from sunset to sunrise.

CHRISTIANIA.—To the eastward of Dram Fiord, is the channel to Christiania, the capital of Norway. It is situated at the farther end of the Fiord or Gulf, in the province of Aggerhuus. In the Christiania Fiord, above Basto Island, are three other lights, all fixed, and kept burning from sunset to sunrise, from the 15th of July to 31st May. The first of them is at Filvet, 12 miles northward of Basto; the light is 26 feet high, and must be left on your port hand going up. The second is at Steilene, 15 miles northward of Filvet; this light is 24 feet high, and must be left on your starboard hand going up. The third is the harbour-light at Haegholmen, 25 feet high. This gulf is enclosed on both sides by lofty mountains, interspersed with numerous rocky islands.

CHRISTIANIA CITY.—The city is well built, and has about 10,000 inhabitants. It was rebuilt in its present situation by Christian IV. of Denmark, after a plan designed by himself. The streets are at right angles with each other, and the houses are of stone. It covers a large extent of ground. On a rocky eminence, on the west side of the bay, stands the Castle of Aggerhuus, at a short distance from the city. That part of the town called the Quartal, which lies close to the harbour, is principally occupied by merchants and public offices. A considerable trade is carried on; and a great annual fair is held on January 13th. The manufactories are but few, cheifly of coarse cloth and cordage; the exports are fish, tar, soap, vitriol, alum, iron, copper, and timber. The harbour is considered good and well sheltered.

At 9 miles S.E. from Fœrder Island, is the little island of Torbjornskier, on which is a beacon, 30 feet high, and formed of two square parts, the lower part or base being much larger than the upper, and is painted red, perpendicular in the middle. This island is about 4 miles distant from the main body of the islands which form the entrances to Frederikshald.

There is no perceptible rise of tide about this part of the coast, from the Naze to Fœrder Island; and the current, which constantly sets along shore to the westward, does not reach so far out from Fœrder to Jomfruland, as it does from Jomfruland to the Naze; yet, 2 or 3 leagues from the coast, it is extraordinary ever to find it setting eastward; and if it occasionally should be perceived to do so, it never continues above a day.

FROM THE NAZE TO BERGEN, DRONTHEIM, &c.

FROM the Naze to Listerland, the course is N.W., several good harbours running in between. The principal of these runs to Fahrsund. A beacon-tower, painted red, with a staff and ball on the top, is erected on Fero Islet, at the entrance to Fahrsund. Listerland, or Gunnarshoug Point, is a low sandy projection, lying far from the high land within it, off which are *some round stones*, called *Lister Steene*, and a *sunken rock* outside, called *Listerflue*, always covered, which are *very dangerous*, as the high land all along the shore puts the former quite out of sight, until you are close upon it; and indeed a ship may run on it in the night before she could perceive it. To warn mariners of these dangers, and direct them to Lister Fiord, a lighthouse is erected at Gunnarshoug Point; it is a round stone tower, white, with a darker ring round the middle. Three fixed lights are shown at an elevation of 125 feet above high water, and visible at the distance of 18 miles.

Having rounded this point, a large opening presents itself, called Lister Fiord, with several islands at its entrance, leading to Fœdde Fiord and Flekke Fiord.

N.E. by E., nearly 5 miles from Gunnarshoug Point, is Varnæs Point, upon which is a lighthouse, bearing a fixed light, which may commonly be seen at the distance of

6 miles. When you have brought it to bear E.N.E. $\frac{1}{4}$ E., its strongest light will be seen at a distance of from 10 to 12 miles.

In case of necessity, when you cannot keep the vessel in the bay, between Hitter-Oe and Lister, you may run in for an anchorage in Fœdde Fiord; for which purpose, you must keep nearer to the Varnæs side, and steer E. $\frac{1}{2}$ N. When you have passed the Varnæs light, and brought it to bear W.S.W., distant a mile, you will be in its strongest light on that side, and may then alter your course to E.N.E. $\frac{1}{4}$ E.; at the same time keeping a good look-out for the *Elleholms* to the southward, and the *small rocks*, called *Mösseskjær* on the north side of the Fiord. By continuing the last-mentioned course, you will proceed up the middle of the Fœdde Fiord, in which the lofty dark mountains on both sides will guide you, if the night be not too dark, even after you have passed Fœdde and Rörvig, where you will have lost sight of the light, in consequence of intervening land. When so far, you will alter your course to E. by N., and then it is time to try for soundings. The whole distance, from Fœdde to the bottom of the Fiord of Oiseaud, is a mile. When you get between 20 and 30 fathoms of water, you must directly let go your anchor, as the ground is very steep.

On the north side of Fœdde Fiord there are also three other places, with the Varnæs light partly in sight, where you may anchor, if day-light and circumstances will permit. These are the bights of Lillehaven, Hougelandsvigen, and Fœdde, the depths in which are between 20 and 30 fathoms, steep and muddy bottom.

If acquainted with the coast, and wish in the night-time to run into the sound, between Hitter-Oe and Annabel-Oe, to Abelnæs, or Engelsholm, you must sail mid-channel into the Lister Fiord, between Kludden and Varnæs, until you bring the Varnæs light to bear S.W. by W.; then a N.N.E. $\frac{1}{4}$ E. course will carry you through the sound.

The main land from Lister Fiord runs N.W. by N. to Lunderviig. Here is the harbour of Eggersund, to which there are two entrances; the southern one running in between the east side of Egger-Oe and the main, the northern channel passing to the northward of Egger-Oe. Between Listerland and Egger-Oe is a *bank*, of from 16 to 50 fathoms, running along, in the direction of the land, 11 or 12 miles, and being at the distance of more than a league from the shore. About 7 miles beyond Egger-Oe is the harbour of Sirevaag, which is said to be very good. In proceeding for this harbour, you should steer towards the sandy bay on the starboard side of the entrance, till being close to the shore, you have the port open; then sailing in for the north or port shore, you run along by it to the southward, to avoid a *rock*, with only 12 feet water upon it, lying off the point on the west side. When you have got to the southward of the west point, you may anchor, in 7 or 8 fathoms, and lie land-locked with all winds, mooring with a cable or hawser to the west shore.

N. by W., 18 miles from Sirevaag, is the Point of Jedderen; off this is a *dangerous reef*, to which a wide berth ought always to be allowed. The land then bends N.E. by N. to several extensive bays, formed by various islands, which are situated between Jedderen and Carm-Oe. On one of these, named Hviddings-Oe, situated about midway, a lighthouse is erected, showing a fixed light with a flash every 4th minute, visible 20 or 22 miles, principally intended to guide the mariner into Carm Sound; on Tungenœs, about 6 miles south-eastward of Hviddings-Oe, is a fixed light visible 6 miles, shown from 1st January to 31st March; and a small fixed light on Tjeldoen, N.N.E., 3 miles from Tungenœs.

Carm Sound is situated between Carm-Oe and the neighbouring islands near the main; through which there is a passage along shore, running into Bommel Fiord, and thence between the islands all the way to Bergen. Carm-Oe lies in a N.N.E. and S.S.W. direction, being 16 miles in length, and about $4\frac{1}{2}$ miles broad at the southern end, but narrowing as it advances to the northward. At its S.E. point, called Skuddesnæs, is a lighthouse, with a fixed light, which points out the western entrance to Carm Sound. There is also a small fixed light at Vigholmen, Skuddesnaes Harbour.

Mariners who wish to enter Carm Sound, may with due attention, distinguish the light of Skuddesnæs from that light of the Isle of Hviddings, the latter showing a flash; but the lantern light on Skuddesnæs shows a fixed light; and besides, this latter light cannot be seen by those coming from the westward, unless so much to the southward, that the cliff of Giœtongen does not interrupt the view of it, or that you have it bearing N.E. by E.; and on this point of the compass the navigation is clear from the Isles of Hviddings; those, therefore, who have gained sight of one light, and are in doubt which it is, should steer a little easterly; the doubt will then be re-

moved; for if it be Skuddesnæs light that appears, the blaze of Hviddings Isles light will shortly be seen, unless in hazy weather, or a snow-storm.

If, by steering eastward, another light soon appears, it must be that on the Hviddings Isles, and a course may thence be set, in order to take a view of another; and if the light on Skuddesnæs be hidden by the high land, and a light should appear more to the eastward than due N.E. by E., then be assured it is the Hviddings Isles light. Having ascertained this, a vessel may steer for Skuddesnæs with safety; and seamen may know to a certainty, by the light, where the bight is, and accordingly run under the land, and so into Carm Sound. At Hoievarde, in Carm Sound, is a fixed harbour-light, 67 feet high. A small fixed light is erected on the east side of Bukken Island, which lies east of Carm-Oe.

Udsire Lights.—Two lighthouses, exhibiting fixed lights, are placed on the Island of Udsire, in latitude 59° 18′ north, and longitude 4° 53′ east. The elevation of the lights above the level of the sea, is 263 English feet; and visible 20 miles. In order that they may serve as beacons during the day, the towers or lighthouses are painted of a light red colour.

These two lights can be seen from every side, and are situated 680 English feet from each other, in a N.E and S.W. direction, by corrected compass, and will burn the year round, viz.:—From Michaelmas to Easter half an hour after sunset, and from Easter to Michaelmas an hour after sunset, and continue till sunrise.

To persons unacquainted, who may be compelled to run into Carm Sound without a pilot, the lights of Udsire, Hviddings and Skuddesnæs will be very useful, and particularly to those who are obliged to cruise there during the night. In that case, it is absolutely necessary to be particularly attentive that the current does not drive the vessel on either side, for it sometimes is very strong.

The extensive opening between Jedderen Reef and Carm Oe, leads to a great number of deep fiords and harbours, where there are many good anchorages, well sheltered from both wind and sea; in one of which, to the southward, stands the town of Stavanger, the inhabitants of which are principally concerned in the fisheries.

Light on Sor Hougoen Rock.—A fixed light visible in all directions, is exhibited on Sor Hougoen Rock, off the northern end of Vibranda Island, in order to guide vessels from Brommel Fiord into Hugo Sound. The tower stands in latitude 59° 25′ 15″ north, and longitude 5° 15′ 30″ east of Greenwich; and being 74 feet above the level of the sea, may be seen at the distance of 12 miles.

The coast of Norway is fronted, all the way to the northward of Carm-Oe, with innumerable islands, between each of which there are deep-water channels, and passages for the largest vessels; but these are so numerous, so various, and so intricate, that no description can possibly be satisfactory, or enable the mariner to navigate them in safety, without the assistance of a pilot. As, therefore, any attempt to trace them with minute accuracy would be vain and useless, we shall endeavour to point out those channels most commonly frequented, and which eventually lead to the town of Bergen.

Small fixed lights, visible 4 miles, are shown at the following places along this part of the coast, viz.: on Rovær Rock, Ryvarden Point, Espevœr Harbour, Oxhammer near Bekhervig, and Pierholmen in Borgholm Sound.

BERGEN, the capital of this part of Norway, is in latitude 60° 24′ north, and longitude 5° 20′ east from Greenwich. It is large, and situated at the bottom of a long bay, enclosed on all sides by rugged and barren rocky islands. These render its harbour sheltered and secure; but its access, through numerous passages, is attended with much difficulty, and no little danger; so that no stranger ought to attempt it without the assistance of a pilot.

On Nordnaes Point near Bergen is a fixed light, visible 4 miles.

In sailing for the harbour of Bergen, vessels proceeding through the Carm Sound, will pass between the Skuddesnæs and the Hviddings lighthouses; and steering to the northward, between Carm-Oe and Luden, they will observe the Hoievarde lighthouse, which is built upon a point of land, at the port side, on the Island of Carm. This channel is narrow, and brings you out through Houge Sound, to the northward of Carm-Oe, where, proceeding along shore at a convenient distance, and in deep water, you enter what is called the Leedt, or Channel of Bergen; the surrounding land is all high.

About 10 miles to the northward of the northen end of Carm-Oe, is the southern extremity of Bommel-Oe, commonly called Bommelhuk. The channel between this and the main is 2 miles wide, and distinguished by the name of the Bommel Fiord; the passage in is about N.E., so far as Moster-Oe; you then turn more easterly, until you

get abreast of Mosterhaven, when, taking a course due north, you enter Stock Sound; from thence, by various channels between the islands, you pass into Selb-Oe Fiord. If you are passing on the outside, or to the westward of Bommel-Oe, it will always be advisable to keep 4 or 5 miles off the land at least, on account of *numerous rocks* and *shoals* which are scattered all about the coast.

Near the middle of Bommel-Oe is the Siggen, a remarkable hill, which, in coming from the westward for Bergen, is frequently the first land you will perceive; therefore when making the land, it will be advisable to bring this hill about S.E. or S.E. by S., keeping rather to the southward, on account of the northerly tide, until you obtain a good breeze to carry you to the northward, where you may stand in for the land, about Selb-Oe, or Kors Fiord.

Selb-Oe Fiord is 26 miles to the northward of Bommel Fiord, being at its entrance $4\frac{1}{2}$ miles wide, and running in E. by S. On your starboard side as you enter, is the *Akleboen Shoal*, with 4 fathoms or less water over it; it lies in the fairway, and may be passed on either side.

Kors Fiord is 11 miles to the northward of Selb-Oe Fiord, and has from 200 to 300 fathoms water within it; the passage in is between the Kalv-Oe and Marsteen, or between the Marsteen and the Texlen-Oe. W.N.W. $\frac{3}{4}$ W., nearly a mile from Marsteen, is a *rock* under water, called *Marsteenboen*. There are various good anchorages between the islands which line the coast, in from 15 to 50 fathoms water, particularly at Kalv-Oe, and the S.E. part of Great Sartor-Oe. The pilots commonly take you into small coves, or harbours, where they fasten the vessel to the rocks. Sartor-Oe is a large island, running in a N. $\frac{1}{2}$ W. direction from Kors Fiord, full 17 miles. On its outer or western side are innumerable islands and rocks, forming passages and harbours for shipping, with deep water all round; but many of them are of too intricate a nature for strangers to attempt. Within, or to the eastward of Sarter-Oe, are the customary channels to Bergen, which are various, as they pass between the islands Leer, Tos, Bior, and Little Sartor; but having arrived so far as the N.E. part of this latter island, the channel opens to the eastward and runs directly up to Bergen.

We have here noticed the customary entrances to Bergen from the southward. To the northward of Sartor-Oe are various other passages, which run into the Guilte Fiord, and are too numerous to describe; suffice it to say, that deep water surrounds almost every island, and there are channels between them all; but the principal great northern passages are through Feye Oosen and Feye Fiord; the former is situated in latitude 60° 44′, and runs in between Flissa and Feye-Oe, being $1\frac{3}{4}$ mile wide, and clear of danger, if we except the Klevesk Rock, which lies on the southern side of its entrance, and must have a berth.

The Feye Fiord is about 7 miles to the northward of the Feye Oosen, and is a wide extensive channel. Its entrance is to the northward of Holmengraa. Having entered this channel, and passed to the eastward of Holmengraa, your course will be south, a little inclined to the east, until you reach the Guilte Fiord; whence, passing to the eastward of Great Sartor-Oe, and north-eastward of Little Sartor-Oe, you will get into the direct channel to Bergen.

There is indeed another passage to the eastward of Ask-Oe through Herle-Oe Fiord called the North-Lee, which leads also to the anchorage of Bergen; this will readily be seen by inspecting the chart, where a particular plan is given of the various entrances to Bergen, correctly pointed out, according to the late Danish Surveys, and published by the proprietor of this work.

TIDES.—Between Holmengraa and Bergen, the flood runs generally to the southward, and ebb to the northward; but in the Leede, to the southward of Bergen, the flood runs to the northward, and the ebb to the southward. Off the land, the ebb, in good weather, will commonly set right across the islands; but the currents are always dependent on the prevailing winds, and are much stronger towards the south than the north.

The tides rise and fall about 4, 5, and 6 feet; but to the southward, about the Naze, the rise is less, and materially influenced by the weather in the North Sea.

The land from the entrance of the Feye Fiord runs in a north-north-easterly direction, and continues encumbered on its frontage with a similar assemblage of rocks and rocky islands; but within the latitude of 61° and 62°, these are mostly of smaller size and dimensions, and interspersed with *numerous shoals* and *rocks*, under water, stretching out full 5 leagues from the main; vessels, therefore, passing these, and bound northward, should give this part a wide berth; for, though these are mostly

steep-to, and have deep channels between them, there are no directions we are able to communicate which could be sufficient to enable the mariner to navigate their intricacies with safety.

A little to the northward of the Feye Fiord is a wide channel, called the Fens Fiord; and beyond that is another, commonly named Sogne Soen, running in E.N.E. ½ E. At its entrance are the little Svalene Islands, passable on either side. To the northward are the Udvœr Isles, which lie in latitude 61° 2′, and longitude 4° 32′ east; these are the outermost islands at this part, and may be passed near-to with safety. About 15 miles farther on are the Bue islands; W.N.W. ½ N. from which, distant 3½ miles, is a *shoal*, called the *Wærgrund*. About 4 leagues beyond the Bue Isles is the entrance to Stav Fiord.

Between these the space is covered with *rocks* and *shoal water*, which must be carefully navigated. *Scattered rocks* continue to line the shore so far as 62° of latitude, near which is the entrance to Bremanger Fiord; having on its southern side, the triangular island of Bremanger, and to the northward, the Isle of Vaagso; this latter island has a *rocky shoal* stretching out from its western side, and forms the southern boundary of the channel into Ulus Vaag, within which are several good anchorages, but rendered dangerous by the rocks about it.

The Stadt Land is a long and broad peninsula, extending from the main, in a N. by W. direction, its N.W. point being in latitude 62° 11′ 30″ north, and longitude 5° 7′ 30″ east. This forms the eastern part of the Ulus Vaag, and the western boundary of Vandels Fiord. Numerous large islands now intervene, between which are the entrances to Rovde Fiord; and to the north-eastward is the Rond-Oe, upon the northern point of which is a lighthouse, in latitude 62° 25′ north, and longitude 5° 35′ east, bearing a fixed light, from the 1st of August to the 16th of May; this is the northernmost of the group, named the Flaaewaers Oerne, consisting of the Islands Scorpa, Neerlands, Moglebust, Boeland, Remoe, and Rond-Oe, and various lesser islets. There are passages between most of them, leading to the Breedt Sund, and also to various good anchorages; but the navigation of these is too difficult for strangers.

At Valderhoug, in Breedt Sund, is a fixed harbour-light, 42 feet in height, and lighted between the 1st of August and the 16th of May, every night, from sunset to sunrise.

The Breedt Sund is 2½ miles wide at its entrance, between Hareidlandet and God-Oe. The channel then runs, in a circuitous and irregular manner, between the main land and a cluster of islands, generally named Romdal's Oerne. These islands are mostly surrounded on their north-western sides by *extensive rocky shoals*. There are channels between most of them, leading in to the anchorages in Harroe Fiord, and the town of Molde; also through the northern channel, called Lyngvaer Fiord, and Boe Sund; at this latter place the anchorage is good, and convenient for sailing out to the northward.

From the entrance to Lingvaer Fiord, the land runs E. ½ N., and is encumbered with a continuation of these *rocky shoals*, obliging the navigator to give it a good berth in passing. About 13 miles from Boe Sund, is the entrance of the southernmost channel to Christian Sund.

CHRISTIAN SUND is singularly situated, and chiefly built, irregularly, upon three rocky islands, which enclose a good and secure harbour, with a wharf, and other necessary accommodations. It is in latitude 63° 7′ 26″ north, and longitude 7° 42′ 10″ east of Greenwich.

Vessels sailing from Boe Sund to Christian Sund, will steer E. by N. and E. ½ S., giving the land a berth of 1½ mile, in which route they will have from 35 to 45 fathoms; and leaving Quitholmen on the starboard side, they will pass to the eastward of Fugden and Fuglenerne, a little island, with a *rocky shoal* stretching from it. At 2 miles E.N.E. from Quitholmen, is the *Fognan Rock*, under water; you will pass on either side of this danger. About 1½ mile farther, you will meet with the *Ballerman Shoal;* between which and the *Tromskier*, a *rock* above water, you will have 8, 10, and 12 fathoms. The channel is then open, and free from any hidden danger, all the way to the harbour of Christian Sund.

Vessels coming from seaward, frequently go to the northward of the Fuglen and Ballerman, and along the southern side of the rocky bank of Myholmene, their course in being S.E. by E., taking care not to approach Quitholmen within 4 miles, when you have it between the bearings of S.E. and S.S.E.; after which endeavour to pass it at the distance of 2 miles. Continue on an E.S.E. course 4 miles farther; and

when abreast of Uhrvaagen, steer E. ½ N.; this will carry them past the Brake Rock, at the east point of Myeholmene; then steer E.N.E. ¼ E., about 4 miles, to the eastern end of the Bank of Kavnene, your depth being 40, 50, and 60 fathoms throughout. Having reached the northern part of Bremsnœ, turn round in the direction of the land, taking care to give the *rock Sveggen* a proper berth; and when you get the channel between Bremsnœ and Kirkelandet open, steer right in for Christian Sund. There is a good passage between the two banks Mycholmene and Ravnene; but being without any leading-marks, it is considered hazardous, and therefore seldom adopted.

The usual and most common entrance to Christian Sund, is to the northward of the Ravnene Shoal; in which route you will bring the western part of Kirkelandet to bear S.E. by S., and pass midway between Sicelbrœn and Kraaka Rocks on one side, and the Trefflosen and Rundskiellengen Rocks on the other; these are always visible above water. Having cleared these, you will have 55, 60, 50, 45, and 35 fathoms water, the latter depth being near the entrance to Christian Sund On the northern side of this passage you will see the *Grib Oerne*, a *cluster of barren rocky islands*, which are dangerous to approach too near. On the north-eastern side of these islands is the Grib Hoelen, or southern entrance to the channel of Drontheim.

Lights of Christian Sund.—The Marine Department of the Royal Norwegian Government have given the following particulars and instructions respecting the lights on Quitholmen and Staveness, which were first lighted on the 1st of September, 1842. —Quitholmen light is a revolving one, which every minute throws out a light, of from 10 to 12 seconds' duration, and is followed by an eclipse, though not a total one. The said light, under ordinary circumstances, when the eye is 10 to 15 feet above the level of the sea, may be seen at the distance of 18 to 20 nautical miles, in the direction of S.S.W. ¾ W., through west, north, and east, up to S.S.E. ¾ E., and is situated in latitude 63° 2′ 15″ north, and longitude 7°.12′ 15″ east of Greenwich; its altitude above the level of the sea being 138 feet. The light-tower is painted white. Coming from the west at night-time, with the intention to enter the Fugel Channel (Fugleledit) the light must be brought to bear E.S.E. ½ E.; after which a ship may steer for the same, until within about ½ a league, when the course must be altered to E. ½ N., by which she will pass at about 2 or 3 cables' length outside the Fognan.

In case the Fognan Fall should be straight a-head, it would be well to keep it on the starboard side: but there is no danger in passing the same on either side. However, if the course is kept E. ½ N. as directed, the noise of the water-fall will, of itself, convince any one that he must be near it; though, for better security, it is to be observed, that the light on Quitholmen is then S.W. by W. ¾ W. From this point the course lies east and E. ½ N. for 1¼ league, till the Braka Falls are passed; when the course is altered to E.N.E. ¼ E., till the light of Stavness is in sight. With the intention to pass round the Fugel into the channel, a ship ought not to come nearer the light of Quitholmen than 4 to 6 miles, or before it bears S. 21° E., when she may steer straight up to it; but not if the Quitholmen light should bear more southerly than S. 2° E., in which case it would bring her too near the Olan Rock.

Stavness light is fixed, which, under the above-mentioned circumstances, may be seen at 12 miles' distance, in all directions of the compass, from N.W. by W. ¾ W., through north and east to S.E. It is situate in latitude 63° 7′ north, and longitude 7° 38′ 15″ east of Greenwich. Its altitude above the level of the sea is 67 feet; and, in order to serve as a land-mark for ships intending to enter the Treffloss, the buildings are painted with a bright colour. Ships bound to Christian Sund must, as soon as the light of Stavness is in sight, alter their course from east to south, and steer the same, till the light of Stavness bears S.S.E. ½ E., and till arrived at the side, where the light is visible, when the course is to be altered to the S.E. A vessel will pass between Smorviganess and the shore; and as soon as the sound is open, an easterly course is kept into the harbour, where there is good anchorage, in 8 to 12 fathoms water. Should the ship have drifted past the harbour, she may, by the assistance of the light of Stavness, put into Treflos, as by steering straight for it as soon as it bears S.E. ½ E., she will run clear of all rocks. Bound for Christian Sund, the course is as above described, as soon as the ships have neared the lights within ¾ of a league.

Both lights burn from the 1st of August to the 16th of May; and are lighted from Easter to Michaelmas one hour, and from Michaelmas to Easter half an hour after sunset till sunrise.

DRONTHEIM, or TRONDHEIM, is a large and populous town, being the capital of the province in which it is situated. It stands on the south bank of an

arm of the sea, by which it is surrounded. It was formerly the residence of the King's of Norway; it has a castle, and good harbour, and is extremely well calculated to carry on an extensive commerce. The chief exports are copper, iron, timber, and fish; the imports are corn, wine, cloths, groceries, &c. Its population is said to be 9,000 or 10,000.

The Grib Hoelen, or southern entrance to the channel of Drontheim, is in latitude 63° 15′ 30″ north. As you run in leave the Grib Oerne (before-mentioned) on the starboard side, and the Soelvœret Islands and Rocks, on which is a beacon, on your port; having passed which, there is a *dangerous rock*, called *Soelvœrsboen*, almost in mid-channel; you may pass on either side of this danger, but it will be most prudent to borrow on the starboard shore. From abreast of this rock, your course up the Drontheim Leede, or Channel, will be nearly east, so far as the Island Edd, or Edd-Oe; then steer E. by N. $\frac{1}{2}$ N., so far as Wœer-Oe. An east course will then take you to Homskael-Oe, where the channel is narrowed by several islands; and from thence you will sail E. $\frac{3}{4}$ N. to the Islands of Lexen, behind which vessels commonly anchor. An E. by N. direction will carry you from the Lexen Islands to Agnoes Flua, where the Drontheim Leede opens, and turns southerly towards the town of Drontheim.

When proceeding from Christian Sund, or the Grib Hoelen Channel, to Drontheim, there are 4 fixed lights to be passed in the channel going up, and lighted from the 1st of August to the 16th of May, every night, from sunset to sunrise. The first is Ringholmen light, at the east end of Edd Islands, 54 feet high, to be passed on the port side. The second is at Terningen, 24 miles eastward of Edd; it is 103 feet high, and must also be left on the port side going up. The third is at Agdaness Point, 20 miles eastward of Terningen; the light is 119 feet high, and must be left on the starboard side. In rounding this light, the course of the channel changes to the southward, running towards Drontheim. The fourth is the harbour-light of Monkholmen, 45 feet high; it lies 21 miles south-eastward of Agdaness Point, and is the guide to the harbour of Drontheim.

The Ramso Fiord, or northern entrance to Drontheim, is in latitude 63° 30′ north, and runs in to the eastward of the Island of Smolen. This island is surrounded with *rocks*, both above and under water, particularly at its S.W. and north-western parts; and must always have a wide berth, both in entering the Grib Hoelen, and also the Ramso Fiord. The rocks of Soelvœret, in the former, have been noticed already. *Two rocky banks*, at the southern entrance of Ramso Fiord, are distant 9 miles from the main body of Smolen, and *very dangerous*, having 50 and 100 fathoms close to them. There is also the *Grib Tarren*, or *Nattergalene*, which lies to the westward, distant 15 miles from the land, and equally in the way of both channels. On the south-eastern part of this is a *rock*, with only 9 feet water, while to the north-westward are from 5 to 7 fathoms, and deep water all round. The shallowest rock lies N.N.W. from Grib Oerne, distant 12 miles; and from the outermost, or northern point of the Smolen Banks, nearly W.S.W., distant 17 miles. Great care must be taken to avoid this danger, which, in stormy weather, will readily show itself by the breakers. You will pass on either side of it, the water being unfathomably deep.

In sailing into the Ramso Fiord, you must avoid the *Gessingboan Rock*, which lies at the entrance, steering to the eastward of it; and abreast of the N.W. point of Smolen is the *Midfordboan*, another *dangerous rock*, lying nearly in the middle of the channel; pass this also on the eastern side, and the Svartskiar Rock on the western. Steer on about S. $\frac{3}{4}$ E. for the Baasset Field beacon, and this direction will clear the Ramsoeboan Rock. Having reached thus far, you will open the Drontheim Leede, and may proceed, mid-channel, along the southern shore of Hitteren Island, toward Hemskiœl-Oe and the Lexen Islands, as before directed.

There are several other channels leading to Drontheim, and running in to the northward of Hitteren, such as the Froy Fiorden, between Hitteren and Froyen; the Suul's Fiord, to the northward of Froyen; the Giesing Bogen, and numerous other passages through the Froe and Halten Islands, conducting you to the Froe Havet, or Sea; but these are so complicated, and studded with rocks and islands, that any description we could give would be useless to the mariner; he is, therefore, referred to the chart, where the channels are clearly delineated, and the track through the various channels accurately shown; but no one should attempt the navigation of this, or any other port in Norway, without having the assistance of a pilot.

The Board of Admiralty at Stockholm have given notice, that a fixed light has been established on the Island of Praestoe, in the Gulf of Folden (Province of Drontheim)

situated in latitude 64° 47′ 26″ north, and longitude 11° 8′ east. The light is elevated 29 feet above the level of the sea, and is visible at the distance of 12 miles. It will be lighted every night, between the 1st of August and the 16th of May.

Vessels bound to Naeroe Sound, on leaving the Gulf of Folden, are to observe, that the strongest glare of light is seen when it bears E.N.E., easterly; and that by steering for the light on this bearing, they will avoid the dangers on each side of the channel south of Praestoe; and they are cautioned not to stand so far to the eastward as to lose sight of the light. As soon as they arrive at $\frac{1}{4}$ of a league from Praestoe they should steer N.N.E., till it bear east, when a N.E. course will carry them up to Naeroe Sound.

TIDES.—The flood sets generally N.E. and the ebb S.W.; but with strong westerly winds, the current sets continually north and N.E., both with flood and ebb. On the contrary, with an easterly wind, the current sets constantly to the south-westward, but is seldom so strong. There is, apparently, little or no tide.

GENERAL REMARK.—It is observable, that although Norway lies so far to the northward, yet the havens are seldom entirely frozen up, and the outer part of them never; therefore, vessels can enter these ports at all times in safety. Drift-ice is rarely to be seen to the westward of the Naze; few instances are recorded of the ice having been a hindrance to the navigation of any of the harbours that lie nearest to the open sea.

Northward of Drontheim, along the coasts of Norway, the great ocean current flows towards the N.E., which is, no doubt, the reason why no drift-ice is ever seen in the North Sea, or on the coasts of Norway, although so near the great ice fields.

GENERAL OBSERVATIONS AND DIRECTIONS FOR SAILING OVER THE NORTH SEA.

SHOALING OF THE DOGGERBANK.—"The *Lightning*, steam tender, Master Commander Allen, with Captain Washington, on Monday left the Tyne, having taken in a supply of coal, and proceeded on a second survey of the North Sea. Much alarm has been felt at the shoaling on the Doggerbank, which lies some 60 miles off the north coast of England, and the Admiralty have given instructions for the bank to be sounded. On the last occasion the *Lightning* was out surveying, those on board succeeded in carrying a line of soundings across the North Sea to the coast of Denmark, in the parallel of 55° north, returning in the latitude of 54° north to Flamborough Head, sounding every $\frac{1}{4}$ of an hour night and day. We believe as small a depth as 7 fathoms was found, but information was received from several fishermen that they have struck bottom at $5\frac{1}{2}$ fathoms on the tail of the Doggerbank, and this within 60 or 70 miles of our own coast: a depth that might be fatal to a deeply-laden vessel crossing from the Baltic."—*Shipping and Mercantile Gazette, October 15th*, 1852.

The BANKS in the NORTH SEA are large portions of ground, somewhat shoaler, in general, than the parts which surround them; and their depths, when carefully observed, often tend to inform the mariner when doubtful of his situation. They are of irregular and undefined shapes, and commonly known by the names of the Brown Bank, the Broad Fourteens, the Wells Bank, the White Bank, the Dogger Bank, the Great and Little Fisher's Bank, the Jutland Bank, or Reef, the Long Forties, and other lesser banks. These are neither dangerous nor steep-to, but generally rise by a gradual elevation; and their boundaries will best be understood by the chart. The current over these banks is visibly affected by the winds, but in general inclines towards the N.E., a circumstance particularly necessary to be attended to, as calculated to set the mariner, bound from the British shores toward the opposite coast, beyond his reckoning, and, perhaps, thereby endangering his vessel, in coming too soon upon the shoals which so generally line the shore.

Those, therefore, who sail from the westward, in order to make any part of the coast between the Texel and the Scaw, should look out for land in time; for it is very common in making it to find the distance from 20 to 30 miles less, than when sailing the

contrary way in making the British coast. This particularly happens with south-westerly winds, which, causing a constant current to the east and north-eastward, generally sets across the Jutland Reef and the south side of the Sleeve towards the Scaw Point; or varying its direction with the wind, bends towards the coast of Norway.

It is, therefore, particularly necessary to be cautious, that the northern current does not drive the ship a-head of her reckoning to the northward of the Jutts Reef, especially with south and S.S.E. winds.

The current along shore, above Bovenbergen, sets with westerly winds about 2 miles an hour, and with strong S.S.W. gales, more than 3 miles.

A very deceiving current likewise sets between the Naze of Norway and the Orkney Islands, the knowledge of which is to the mariner, the more important, some of these islands being very low, and generally obscured from view by fog and mist in summer, and annoyed by the most powerful gales in winter.

This current takes its course with the wind, particularly when it blows from the southward or northward; but generally it runs strongest to the northward. As the wind continues, the current increases, and sometimes runs more than 2 knots midway between the Naze and Orkneys, after long-continued S.W. winds.

Easterly or westerly winds, blowing athwart this current, sometimes render it almost insensible in the offing; and within 3 or 4 leagues of the islands the tides take that regular course which they keep between the Orkney and Shetland Islands.

It has frequently been observed, in sailing faom the Naze to Fair Island, the distance has sometimes appeared from 5 to 10 leagues shorter than the distance shown on the chart, which must be occasioned by currents setting to the north and to the west, chiefly when the wind blows from the south or from the east. Between the Jutland Reef and the coast of Norway, the current generally sets to the westward, even with westerly winds, and at the same time, the current on the Jutland coast sets eastward towards the Scaw.

There is also a current with northerly and north-westerly winds, which runs southward by the coast of Norway, across the Jutland Reef, and along the coast of Jutland towards Heligoland. This current, when it blows hard, runs at the rate of $1\frac{1}{2}$ or 2 knots, and requires particular attention by those who are navigating in these parts, during such gales.

A ship bound from England to the Cattegat, with the wind in the N.W. quarter, should endeavour to get well to the northward, before she bears up for the Sleeve, in order to counteract the effects of the current. The same precaution is necessary when bound from the Cattegat to England with those winds; by keeping on the Norway coast, you will have the westerly current in your favour, until you get so far westward as the Naze, provided you do not stand so far southward as the edge of the Jutland Reef. After passing the Naze, you will soon feel the effects of the current, and must judge, from the direction and force of the wind, whether it is prudent to proceed.

On approaching the coast of Norfolk, should you get on the Well's Bank, the ridges near its western edge will indicate your proximity to the Leman and Ower; but if you are farther to the southward, and get 25 to 26 fathoms, you will be in the deep-water channel, and should be very careful, when standing to the westward, until you get to the southward of Smith's Knoll. Between Lowestoft and Aldborough, you may approach the shore to any convenient depth, the soundings being regular, and therefore, this is considered the best part to make the land.

But large ships, during winter, had better endeavour to make the land about Flamborough Head. This bears from the Naze of Norway W.S.W., a little westerly, distant 110 leagues. They then may shape a course so as to clear the Leman and Ower, or sail within the sands, through Hasborough Gat.

In winter, the mariner should avoid going to the southward of Bovenbergen, till he gets well to the westward, that he may have it in his power, in cases of emergency, to bear up for the Sleeve, Norway, or the Sound.

Turning out of the Sleeve with westerly winds, you should keep near the Norway coast, and not stand to the southward of the edge of the Jutland Reef, as the current always sets to the westward on that coast, but does not extend far from the land. Be particularly careful not to stand to the southward of Bovenbergen with a N.W. wind, for fear of being embayed, and prevented from getting out.

A ship of the line, under lower sails, on the starboard tack, with the wind at

N.W. by N. in the S.E. current, here would be looking right for England, and going direct for Holland; for, by allowing two points westerly variation,* the set of the current and her leeway, she will not make better than a south course; therefore, keep the Sleeve open, and the ship will be safe.

It is strongly recommended to all commanders coming from the Cattegat in the winter time, to make the land, if they possibly can, on the Yorkshire coast; then they will avoid the danger of coming in at the back of Yarmouth Sands, and have a good departure to shape a course clear of the Leman and Ower, which ships of the line must do, as it would be dangerous for them to take the coasters' track. Small vessels may keep the coast.

Commanders having the charge of convoy ships bound to the Cattegat, should be careful to get well to the northward, before they make much easting, for fear of being caught with a strong N.W. gale.

---

* THE ABERRATION OF THE NEEDLE, OR LOCAL ATTRACTION, which is more or less in all vessels, will also tend to carry a vessel to the southward of her reckoning whether crossing the North Sea to the eastward or westward.

This deviation of the needle will vary in the same vessel, by changing her cargo, and will always be found greatest when the ship's head is near the east or west parts of the compass. Captain Sir J. Ross, R.N.. says, "While Consul at Stockholm, I proved, by actual experiment, on board three constant traders (of about 300 tons each), between that place and Hull, their deviation when arriving at Stockholm, with a cargo of cotton, and other merchandise, was totally different than when loaded with deals and iron. The masters of these vessels, though excellent seamen, were ignorant of the existence of local deviation; and on the passage across the North Sea, on the homeward course, they allowed *two points* for what they call *in-draught* but on the outward course, *nothing*. I found that their extreme deviation, on arriving, was from one quarter to half-a-point; but on sailing, after being loaded with iron and deals, it was fully two points."

Captain Sir J. Ross, further remarks,—"When in the *Victory*, bearing the flag of Admiral Sir J. Saumarez, in 1808 as first lieutenant, I forthwith discovered the ship had a deviation of *seventeen degrees* on a western course; that, therefore, it was necessary, after the course was corrected for variation, to steer seventeen degrees more to the *starboard*, in order to make the direct, or true course."—*On Deviation of the Mariner's Compass, by Sir J. Ross, R.N.*, 1849.

TABLE OF MAGNETIC BEARINGS AND DISTANCES.

Names of Places.	*Compass Bearings.*	*Miles*
From the North Foreland Lighthouse to the Goodwin Light-vessel	S.E. $\frac{1}{2}$ S.	6
.....Galloper ditto	N.E. by E. $\frac{1}{2}$ E.	29
.....Calais	S. $\frac{2}{3}$ E.	29
.....Dunkirk	S.E. $\frac{3}{4}$ S.	40
.....Ostende	S.E. by E. $\frac{1}{4}$ E.	56
.....Walcheren W. Kapelle	E. by S. $\frac{1}{4}$ S.	75
.....Goeree Gat	E. $\frac{1}{2}$ S.	92
.....S. Entrance of the Texel	E. by N. $\frac{1}{4}$ N.	150
Orfordness to Calais	S. by W. $\frac{1}{4}$ W.	68
.....Dunkirk	S. $\frac{1}{4}$ E.	69
.....Ostende	S.S.E.	72
.....West Kapelle	S.E. $\frac{1}{2}$ S	76
.....Goeree Gat	S.E. by E.	86
.....the South Entrance of the Texel	East	121
.....the Naze of Norway	N.E. $\frac{1}{2}$ E.	400
Lowestoft to Dunkirk	S. $\frac{3}{4}$ W.	89
.....Ostende	S. $\frac{2}{3}$ E.	87
.....West Kapelle	S.S.E. $\frac{1}{4}$ E.	85
.....Goeree Gat	S.E. $\frac{1}{2}$ S.	87
.....the S. Entrance of the Texel	E. $\frac{3}{4}$ S.	108
.....Heligoland	East	242
.....Hjerting	E. by N. $\frac{1}{2}$ N.	293
.....Bovenbergen	N.E. by E. $\frac{3}{4}$ E.	326
.....the Naze of Norway	N.E. $\frac{3}{4}$ E.	375
Spurn Head, the Humber, to the S. Entrance of the Texel	S.E. $\frac{3}{4}$ E.	165
.....Borkum Light	E.S.E.	228
.....Heligoland	E. by S. $\frac{1}{4}$ S.	275
.....Hjerting	East	308
.....Bovenbergen	E. by N.	326
.....the Naze of Norway	N.E. by E. $\frac{3}{4}$ E.	350
Flamborough Head to the S. Entrance of the Texel	S.E. $\frac{1}{4}$ S.	182
.....Heligoland	E.S.E.	274
.....Bovenbergen	E. $\frac{1}{2}$ N.	310
.....the Naze of Norway	E.N.E. $\frac{1}{4}$ E.	330
.....Skuddesness Light	N.E. by E.	345
Tynemouth, Newcastle, to the S. Entrance of the Texel	S.E. $\frac{3}{4}$ S.	248
.....Heligoland	S.E. by E. $\frac{1}{4}$ E.	324
.....Hjerting	E. by S. $\frac{3}{4}$ S.	337
.....Bovenbergen	E. $\frac{3}{4}$ S.	330
.....the Naze of Norway	E. $\frac{3}{4}$ N.	332
Berwick to Heligoland	S.E. $\frac{1}{2}$ E.	345
.....Bovenbergen	E. by S. $\frac{1}{2}$ S.	338
.....the Naze of Norway	E. $\frac{1}{4}$ S.	325
May Island Light to Heligoland	S.E. $\frac{1}{4}$ E.	370
.....the Naze of Norway	E. $\frac{1}{2}$ S.	332
.....Skuddesness Light	E. by N.	307
Bell Rock to Buchanness	N.E. $\frac{1}{4}$ N.	67
.....St. Abb's Head	S. by W.	32$\frac{1}{2}$

Names of Places.	*Compass Bearings.*	*Miles.*
From Bell Rock to Heligoland	S.E.	370
..... South Entrance of the Texel	S.S.E. $\frac{1}{4}$ E.	322
Buchanness to the Entrance of the Texel	S. by E. $\frac{1}{4}$ E.	350
..... Heligoland	S.E. by S.	384
..... the Naze of Norway	E. by S. $\frac{3}{4}$ S.	280
Duncansby Head to Heligoland	S.E. by S. $\frac{1}{2}$ S.	450
..... the Naze of Norway	S.E. by E.	312
..... Skuddesness Light	E. by S. $\frac{3}{4}$ S.	250
..... the Kors Fiord, Entrance to the Bergen	E. $\frac{1}{2}$ S.	252
..... Boe Sund, Entrance of Christian Sund	E. by N. $\frac{1}{2}$ N.	394
..... Rams-Oe Fiord, the Northern Entrance to Drontheim	E. by N. $\frac{1}{2}$ N.	425
The Naze of Norway to the Scaw	S.E. by E. $\frac{1}{2}$ E.	115
Dennis Ness to the Naze of Norway	S.E. $\frac{1}{4}$ E.	303
..... to Skuddesness	S.E. by E. $\frac{1}{2}$ E.	230
Dennis Ness to Fair Island	E. $\frac{1}{2}$ S.	25
..... Kors Fiord	E. by S. $\frac{1}{4}$ S.	222
..... to Rondo Light, Breedt Sund	E. by N. $\frac{1}{4}$ N.	292
..... Rams-Oe Fiord	E. by N. $\frac{1}{2}$ N.	388
Sumbro' Head Light to Fair Island	S.W. by W.	21
..... the Naze of Norway	S.E. $\frac{1}{2}$ S.	274
..... Kors Fiord	E.S.E. $\frac{1}{2}$ E.	180
..... to Rondo Light, Breedt Sund	E. by N. $\frac{1}{4}$ N.	248
..... Rams-Oe Fiord	E.N.E. $\frac{1}{2}$ E.	346
Hangcliff or Noss Head, to Heligoland	S. by E. $\frac{1}{4}$ E.	450
..... the Naze of Norway	S.E. $\frac{3}{4}$ S.	280
..... Skuddesness Light	S.E. easterly	196
..... Kors Fiord	E.S.E. $\frac{1}{4}$ S.	170
..... to Rondo Light, Breedt Sund	E. by N.	232
..... Rams-Oe Fiord	E. by N. $\frac{1}{4}$ N.	332
Lambaness to the Naze of Norway	S.S.E. $\frac{1}{2}$ E.	294
..... Kors Fiord	S.E. $\frac{1}{2}$ E.	167
..... to Rondo Light, Breedt Sund	E. $\frac{1}{4}$ N.	203
..... Rams-Oe Fiord	E. by N.	293

THE END.

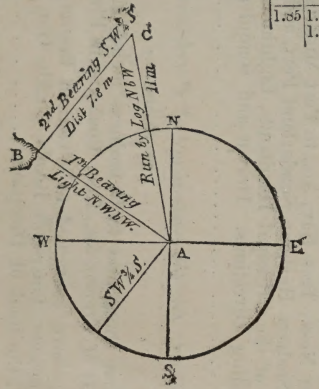
JAMES COOKE, PRINTER, 51, FENCHURCH STREET.

A USEFUL TABLE FOR FINDING THE DISTANCE OF AN OBJECT BY TWO BEARINGS, AND THE DISTANCE RUN BETWEEN THEM.

Difference between the Course and Second Bearing in Points of the Compass.

Pts	4	¼	½	¾	5	¼	½	¾	6	¼	½	¾	7	¼	½	¾	8	¼	½	¾	9	¼	½	¾	10	¼	½	¾	11	¼	½	¾	12	¼	½	¾	Pts
2	1.00	0.89	0.81	0.74	0.69	0.64	0.60	0.57	0.54	0.52	0.49	0.48	0.46	0.45	0.43	0.42	0.41	0.41	0.40	0.39	0.39	0.39	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.40	0.41	0.41	0.42	0.43	0.45	2
2¼		1.12	1.00	0.91	0.83	0.77	0.72	0.67	0.64	0.60	0.58	0.55	0.52	0.51	0.50	0.48	0.47	0.46	0.45	0.45	0.44	0.44	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.45	0.45	0.46	0.47	0.48	2¼
2½			1.23	1.10	1.00	0.92	0.85	0.79	0.74	0.70	0.67	0.64	0.61	0.59	0.57	0.55	0.53	0.52	0.51	0.50	0.49	0.49	0.48	0.48	0.47	0.47	0.47	0.47	0.47	0.48	0.48	0.49	0.49	0.50	0.51	0.52	2½
2¾				1.34	1.20	1.09	1.00	0.93	0.86	0.81	0.77	0.73	0.69	0.67	0.64	0.62	0.60	0.58	0.57	0.56	0.55	0.54	0.53	0.52	0.52	0.52	0.51	0.5	0.51	0.52	0.52	0.52	0.53	0.54	0.55	0.56	2¾
3					1.45	1.30	1.17	1.08	1.00	0.93	0.88	0.83	0.79	0.75	0.72	0.69	0.67	0.65	0.63	0.61	0.60	0.59	0.58	0.57	0.57	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.57	0.57	0.58	0.59	3
3½						1.56	1.39	1.26	1.16	1.07	1.00	0.94	0.89	0.84	0.80	0.77	0.74	0.72	0.69	0.68	0.66	0.64	0.63	0.62	0.61	0.61	0.60	0.60	0.60	0.60	0.60	0.60	0.61	0.61	0.62	3½
3¾							1.66	1.48	1.35	1.23	1.14	1.07	1.00	0.94	0.90	0.86	0.82	0.79	0.76	0.74	0.72	0.70	0.69	0.67	0.66	0.65	0.65	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.65	0.65	3¾
4								1.76	1.57	1.42	1.31	1.21	1.13	1.06	1.00	0.95	0.91	0.87	0.84	0.81	0.78	0.76	0.74	0.73	0.71	0.70	0.69	0.68	0.68	0.67	0.67	0.67	0.67	0.67	0.68	0.68	4
4½									1.85	1.65	1.50	1.37	1.27	1.19	1.11	1.05	1.00	0.95	0.92	0.88	0.85	0.82	0.80	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.71	0.71	0.71	0.71	0.71	0.71	4½
4¾										1.94	1.78	1.57	1.44	1.33	1.24	1.17	1.10	1.05	1.00	0.96	0.92	0.89	0.86	0.84	0.82	0.8	0.79	0.77	0.76	0.76	0.75	0.74	0.74	0.74	0.74	0.74	4¾
5											2.02	1.81	1.64	1.50	1.39	1.30	1.22	1.15	1.09	1.04	1.00	0.96	0.93	0.90	0.88	0.86	0.84	0.82	0.81	0.80	0.79	0.78	0.78	0.78	0.78	0.78	5
5½												2.10	1.88	1.70	1.56	1.45	1.35	1.27	1.20	1.14	1.08	1.04	1.00	0.97	0.94	0.91	0.89	0.87	0.85	0.84	0.83	0.82	0.81	0.81	0.80	0.80	5½
6													2.17	1.94	1.77	1.62	1.50	1.40	1.31	1.24	1.18	1.12	1.08	1.04	1.00	0.97	0.94	0.9	0.90	0.88	0.87	0.86	0.85	0.84	0.83	0.83	6
6½														2.24	2.01	1.82	1.67	1.54	1.44	1.34	1.28	1.21	1.16	1.11	1.07	1.05	1.00	0.97	0.95	0.93	0.91	0.90	0.88	0.87	0.87	0.86	6½
6¾															2.30	2.06	1.87	1.71	1.58	1.48	1.39	1.31	1.25	1.19	1.14	1.10	1.06	1.0	1.00	0.97	0.95	0.94	0.92	0.91	0.90	0.89	6¾
7																2.36	2.11	1.92	1.76	1.63	1.52	1.43	1.35	1.28	1.22	1.17	1.12	1.09	1.05	1.02	1.00	0.98	0.96	0.94	0.93	0.92	7
7½																	2.41	2.16	1.96	1.80	1.66	1.55	1.46	1.38	1.31	1.25	1.19	1.15	1.11	1.08	1.05	1.02	1.00	0.98	0.97	0.95	7½
7¾																		2.46	2.20	2.00	1.83	1.69	1.58	1.48	1.40	1.33	1.27	1.22	1.17	1.13	1.10	1.07	1.04	1.02	1.00	0.98	7¾
8																			2.50	2.24	2.08	1.93	1.80	1.69	1.59	1.51	1.42	1.35	1.29	1.24	1.19	1.15	1.11	1.08	1.06	1.03	8
8½																				2.55	2.27	2.04	1.86	1.72	1.61	1.51	1.42	1.35	1.29	1.24	1.20	1.16	1.13	1.10	1.07	8½
8¾																					2.56	2.29	2.08	1.91	1.76	1.65	1.55	1.46	1.39	1.32	1.27	1.22	1.18	1.14	1.11	1.09	8¾
9																						2.58	2.31	2.10	1.92	1.78	1.66	1.56	1.47	1.40	1.34	1.28	1.23	1.19	1.15	1.12	9
9½																							2.60	2.33	2.11	1.93	1.79	1.67	1.57	1.48	1.41	1.34	1.29	1.24	1.20	1.16	9½
9¾																								2.61	2.34	2.12	1.94	1.80	1.68	1.57	1.49	1.41	1.35	1.29	1.24	1.20	9¾
10																									2.61	2.34	2.12	1.94	1.80	1.68	1.58	1.49	1.41	1.35	1.29	1.24	10
10½																										2.61	2.34	2.12	1.94	1.80	1.68	1.58	1.49	1.41	1.35	1.29	10½
																											2.60	2.33	2.11	1.94	1.79	1.67	1.57	1.48	1.41	1.34	
																												2.58	2.31	2.10	1.92	1.78	1.66	1.56	1.47	1.40	
																													2.56	2.2	2.08	1.91	1.76	1.65	1.55	1.46	
																														2.53	2.27	2.06	1.89	1.75	1.63	1.53	
																															2.50	2.24	2.03	1.86	1.72	1.61	
																																2.46	2.20	2.00	1.83	1.69	
																																	2.41	2.16	1.96	1.79	
																																		2.36	2.11	1.92	
																																			2.30	2.06	
																																				2.24	

Difference between the Course and First Bearing in Points of the Compass.



A.—The place sailed from.

B.—Flamborough Head Light.

C.—The place arrived at.

The Figure is constructed with a Scale 10 to an inch.

EXAMPLE.—Flamborough Head light bearing N.W. by W., and after running N. by W., 11 miles by Log, it bore S.W. ¾ S.; required the distance from the light, at the time the last bearing was taken.—Enter the Table with the difference, in points, between the ship's head and the first bearing (4 points), at the side, and the difference between the ship's head and the second bearing (11¾ points), at the top, which will give 0.71; then this multiplied by the distance run (11 miles), gives 7.8 miles—the distance from the light at the time of last bearing.—[See Figure.]

The following Charts are Published and Sold by

C. WILSON,

(Late J. W. NORIE & WILSON,)

157, LEADENHALL STREET, LONDON.

A New and Improved CHART of the ENGLISH CHANNEL, with the BRISTOL CHANNEL and the South Coast of Ireland, including the edge of the Bank of Soundings, with Plans of the Principal Harbours; accompanied by a Book of Sailing Directions, newly arranged and revised, by J. S. Hobbs, F.R.G.S., Hydrographer 10s 6d

A CHART of the ENGLISH CHANNEL, with the Bristol and part of St. George's Channels, and of the North Sea; constructed chiefly from the Surveys made by order of the British, French, and Dutch Governments; with a Book of Directions, by J. S. Hobbs 12s

The same with additions extending to Liverpool, part of the Isle of Man, Carlingford, Dublin, Galway, &c.; with Directions 14s

Two Sheets of the preceding Chart, extending from the North Sea and London to the Scilly Islands; without a Book of Directions 8s

The ENGLISH CHANNEL, drawn from the Surveys and Observations of Admiral Sir John Knight, K.C.B., and other authentic documents; with numerous Views, and containing Plans of Sheerness, Newhaven, Spithead, Portland, Exmouth, Dartmouth, Mount's Bay, the Longships, Scilly Islands, and St. Vincent's Passage; with Directions 12s

The ENTRANCES to the RIVER THAMES, exhibiting the various channels from the Nore to the Downs, Harwich, Orfordness, and Aldborough; with Plans of the Rivers Thames and Medway, from the Nore to Chatham and Gravesend, and from Gravesend to London; on a very large scale with Directions 7s 6d

A New CHART of the EAST COAST OF ENGLAND, from Dungeness to Newcastle-upon-Tyne, including the Entrances of the River Thames to London; and the Coast of France, &c., from Boulogne, to Flushing; with enlarged Plans of the following Harbours, &c.:—Harwich Harbour and Entrance to ditto; Lowestoft Roads, Cockle Gat, Boston Bar, Yarmouth Roads, and Coast from Covehithe Ness to Winterton Ness; Tees Bay, &c., to Port Middlesboro', Scarborough, Hartlepool Bay, New Seaham Harbour, Sunderland Port, and the River Tyne to Newcastle; with Views of the Principal Headlands, Lighthouses, &c., and accompanied by a Book of Sailing Directions. Drawn and compiled from the latest Surveys, by J. S. Hobbs 12s

The above Chart, for the convenience of Purchasers, is sold in separate Parts, as follow:—

SHEET I.—From Dungeness to Orfordness, including the River Thames to London; and the Coast of France, &c., from Boulogne to Flushing; without Directions 4s

PART I.—The above continued to Wisbeach Boston, &c.; with enlarged Plans of Harwich Harbour, Lowestoft Roads, Cockle Gat, and Boston Bar, Views, &c., 7s 6d.; with the Book of Directions 9s

PART II.—From Southwold and Lowestoft to Newcastle; including Yarmouth, Lynn Deeps, River Humber, &c.; with enlarged Plans of Lowestoft Roads, Cockle Gat, Boston Bar, Yarmouth Roads, &c.; River Tees, &c., to Port Middlesboro', Scarborough, Hartlepool Bay, New Seaham Harbour, Sunderland Port, and River Tyne to Newcastle, Views, &c., 9s; with the Book of Directions 10s 6d